The Metal Worker.

A Weekly Journal of the Tin, Plumbing and House Furnishing Stove Trades.

Published every Saturday Morning, by DAVID WILLIAMS No. 83 Reade Street, New York. Entered at the Post Office, New York, as second-class matter.

The Metal Worker—Vol. XIII, No. 6.
Stove and Tin Trade Journal—Vol. XIV, No 16.

NEW YORK, SATURDAY, FEBRUARY 7, 1880.

$1.20 a year, Including Postage

The Patterns for a Cornucopia to be Made in Eight Pieces.

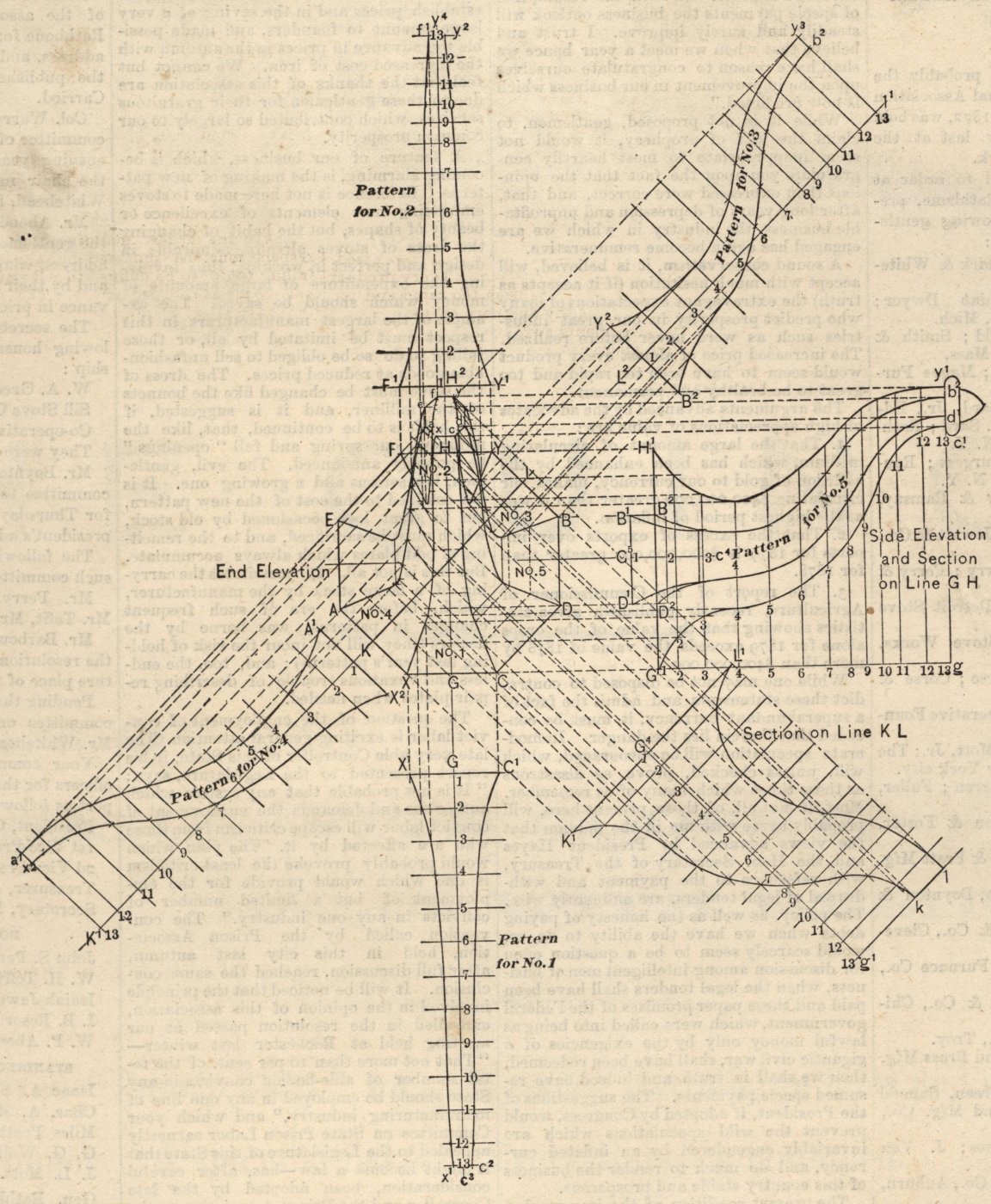
We are in receipt of the following letter from H. J. N., Philadelphia:

"A 'Constant Reader' in a recent number of *The Metal Worker*, asks a favor which is granted. I wish to ask a similar favor, which I hope you will have the kindness to grant. I am in need of a rule by which to construct a cornucopia, or horn of plenty. Will you publish a pattern diagram of it for my accommodation?"

We take pleasure in complying with our correspondent's request, and trust the following may be found useful, although some time has elapsed since his letter was written. There is always of necessity some time consumed in getting practical answers to questions and preparing the engravings, but all reasonable requests receive due attention and are answered sooner or later. We are led to these remarks at this time by the fact that we have now in preparation answers to questions of similar character from other readers, who may suppose from the necessary delay that they are not receiving proper attention. All will be reached in regular turn.

As our correspondent is not specific in his request—does not indicate any particular style—we have selected one octagon in section, and curved in only one plane. The difficulty and expense of making in sheet metal a cornucopia having curves in more than one plane, that is, twisted, precludes for all practical purposes a construction of that kind, although it is probably within the range of possibilities to work out the patterns. It is doubtful whether the patterns we here present do not involve too much careful labor to render the ornament so constructed one of real utility and expediency. However, every pattern cutter ought to be familiar with the principles involved and their application. Their use occurs in many other forms besides cornucopias.

In the engraving we show the side and end elevations of an octagonal cornucopia. The first step in the development of the patterns is a correct representation of the article in the two views just named. It is not our purpose in this connection to describe in detail the method of drawing these two views; certain parts must necessarily be conceived in the mind before they are laid upon the paper. For example, having determined that the article is to be constructed in eight pieces and that its size at the mouth is to be of given dimensions, draw the section E F Y B D C X A opposite its corresponding line H^1 G^1 in the side elevation. Having determined the length of the article and its general shape, the profiles H^1 y^1 of the top and G^1 c^1 of the bottom are drawn. The end elevation is then worked out from these lines, by means of corresponding points carried across, after which the intermediate lines showing the side, which is turned directly toward the sight, are inserted, being derived in the same way from the sectional view. We think this much of a general description will enable the intelligent reader to construct the necessary views of such an article. But ordinarily, work of this character comes to the pattern cutter already drawn, the labor of delineating it being the work of a draftsman and designer rather than that of the pattern cutter. Accordingly we commence our description with the assumption that the side and end elevations have been correctly drawn.



The Patterns for an Octagonal Cornucopia.

By inspection of the side elevation it will be seen that the profile of piece No. 1 is to be taken directly from the lower line in the side elevation. Therefore, at right angles to X C, forming the side of the plan bounding section No. 1, lay off a stretchout taken from the profile G^1 c^1, as shown by G^3 C^3. Through the points used in laying off this stretchout, draw measuring lines in the usual manner. From the corresponding points in the profile G^1 c^1 carry lines across section No. 1 in the end elevation, cutting the two miter lines as shown. With the T-square at right angles to the side X C and brought successively against these points in the two miter lines, cut corresponding measuring lines. Then lines traced through these several points of intersection, as shown by X^1 x^1 and C^1 c^2, will give the shape of the pattern of this section.

In like manner take a stretchout of the profile of the upper side H^1 y^1 of the side elevation, and lay it off at right angles to the side of the plan F Y, bounding section No 2, all as shown by H^2 y^4, through the points in which draw the usual measuring lines. From the points in the profile H^1 y^1 carry lines across the end elevation, cutting the miter lines bounding section No. 2. Then with the T-square at right angles to the side F Y of the plan, bringing it successively against the several points in the miter lines bounding section No. 2, cut the corresponding measuring lines. Then lines traced through these points of intersection, as shown by F^1 f^1 and Y^2 y^2, will be the pattern for section No. 2.

For sections Nos. 3 and 4 situated diagonally to the section by which the stretchouts for the two patterns just described were obtained, another sectional view of the cornucopia must be constructed. To obtain stretchouts for these patterns a section must be taken through the article at right angles to their respective sides. Our next step, therefore, is to construct a section corresponding to the line K L, drawn through the plan. For which we proceed as follows:

Through the point G^1 draw a horizontal line G^1 g, upon which drop points from the profile G^1 c^1, all as indicated by the small figures. At right angles to K L, at any point convenient for the required section, draw G^4 g^1 in length equal to G^1 g, in which set off points corresponding to the points in G^1 g. Through these points draw lines after the usual manner of measuring lines. In order to obtain the points in the end elevation from which to draw lines cutting these measuring lines by which to determine the diagonal section, we proceed as follows: From the points in the line D^2 d^1 carry lines, cutting the line A a in end elevation, and in like manner from the line B^2 b^1 carry lines cutting the line B b of the end elevation. By this means it will be seen that in the boundary lines of pieces Nos. 4 and 3 the same points have been obtained, both being derived from lines in the side elevation having corresponding divisions. Therefore, if these points be connected by drawing lines across the respective sections and their middle points be taken, we shall have points of measurement by which to construct the diagonal section. The diagonal line K L cuts a number of these cross lines in the center, but the others, on account of the distortion of the end elevation, will fall at other points than in the line K L. It will be seen, as for instance, that the line corresponding to 8, crosses section No. 4 obliquely, but still its center point must be the center point in the section. Therefore, from the center point in the two sections, Nos. 4 and 3, thus determined, draw lines cutting the measuring lines drawn through G^4 g^1. Then lines traced through these intersections as shown by L^1 l and K^1 k, will form the diagonal sections of the article corresponding to a line K L.

For the pattern of No. 3 proceed as follows: At right angles to its side W B lay off a stretchout corresponding to the side of the section constructed, agreeing with it. In other words, make the stretchout L^2 l^1 equal to L^1 l of the section. Through the points draw measuring lines in the usual manner. Bring the T-square successively against the points in the miter lines bounding No. 3, placing the blade at right angles to the side Y B, and cut corresponding measuring lines. Then lines traced through the points of intersection thus formed, as shown by B^2 b^2 and Y^2 y^3, will form the pattern of No. 3.

In like manner, for the pattern of No. 4 proceed as follows: At right angles to the side A X lay off a stretchout, taken from the side of the section K^1 k, which corresponds with it, all as indicated by K k^1,

through the points in which draw the usual measuring lines. Place the T square at right angles to the side A X and bring it successively against the points in the miter lines, bounding piece No. 4 cut to corresponding measuring lines. Then lines traced through the points of intersection thus obtained, as shown by X^2 x^2 and A^1 a^1, will be the pattern for it.

The pattern for No. 5 is obtained directly from the side elevation as shown. That part of it in the smaller portion of the article is bounded by lines so nearly corresponding to the side elevation as to render it impossible, in an engraving so small as here represented, to distinguish between them. It begins to deviate, however, in a manner that may be shown in points corresponding to line No. 4, and a description of this part will serve to illustrate the principle upon which the development of the pattern is based. Commencing with point 4, lay off a stretchout taken from the corresponding portions of the profile G^1 C^1, as indicated by the small figures 3, 2, 1, in the line G^5 c^4. Through these points draw measuring lines in the usual manner, and with the T-square placed at right angles to them and brought against corresponding points in the sides of piece No. 5, as shown in the side elevation intersecting them. Through these points trace lines, all as indicated by the lines terminating at B^1 D^1, then B^1 b^2 d^1 D^1 will be the pattern piece No. 5.

The National Association of Stove Manufacturers.

Proceedings of the Ninth Annual Meeting.

The most important, and probably the largest, meeting of the National Association of Stove Manufacturers since 1872, was held on Wednesday and Thursday last at the Fifth Avenue Hotel, New York.

The association was called to order at 12 m., February 4th, Gen. Rathbone, president, in the chair. The following gentlemen responded to the roll call:

W. H. Whitehead; Tibbals, Shirk & Whitehead, Chicago, Ill.
George H. Barbour, Jeremiah Dwyer; Michigan Stove Co., Detroit, Mich.
E. W. Anthony, D. R. Gould; Smith & Anthony Stove Co., Boston Mass.
Albert N. Parlin, John Magee; Magee Furnace Co., Boston, Mass.
John F. Rathbone, Grange Sard, Jr., Edward Bowditch, William H. Sard; Rathbone, Sard & Co., Albany, N. Y.
Clarence Rathbone, G. D. Burgess; Ransome Stove Works, Albany, N. Y.
N. L. Ely, D. S. Ramsay; Ely & Ramsay, New York City.
Josiah Jewett; Sherman S. Jewett & Co., Buffalo, N. Y.
John S. Perry, Nathan B. Perry; Perry & Co., Albany, N. Y.
W. H. Tefft, E. S. Barbour; Detroit Stove Works, Detroit, Mich.
F. Well, J. Anstice; Sill Stove Works, Rochester, N. Y.
Albert C. Corse, Aug. P. Corse; Corse & Co., Troy, N. Y.
N. Brayer, E. W. Peck; Co-operative Foundry, Rochester, N. Y.
Jordan L. Mott, Jordan L. Mott, Jr.; The J. L. Mott Iron Works, New York city.
Jas. W. Fuller, Walter P. Warren; Fuller, Warren & Co., Troy, N. Y.
W. Corry; Southard, Robertson & Foster, New York city.
Horace E. Walker; Walker & Pratt Mfg. Co., Boston, Mass.
Chas. B. Boynton; Richardson, Boynton & Co., New York city.
R. P. Myers; Myers, Osborn & Co., Cleveland, Ohio.
Jas. H. Coddington; Dighton Furnace Co., North Dighton, Mass.
H. Cribben; Cribben, Sexton & Co., Chicago.
G. G. Wolfe; Wolfe Stove Co., Troy.
D. M. Thomas; Detroit Iron and Brass Mfg. Co., Detroit, Mich.
Wm. N. Monies, Jno. D. Green, Samuel Smyth; The Union Stove and Mfg. Co., Pittston, Pa.
J. Van Wormer, J. C. Barnes; J. Van Wormer & Co., Albany.
C. L. Merritt; Foxell, Jones & Co., Auburn, N. Y.
C. E. Potter; Potter & Co., Troy.
S. T. Peckham; J. S. & M. Peckham, Utica, N. Y.
Sam S. Utter; Chas. Noble & Co., Philadelphia.
S. C. Rodgers; official stenographer, Troy, N. Y.
D. G. Littlefield; Littlefield Stove Co., Albany, N. Y.
A. S. Hubbell; Hubbell & Bro., Buffalo, N. Y.
Isaac A. Sheppard; Isaac A. Sheppard & Co., Philadelphia and Baltimore.
I. B. Resor; Wm. Resor & Co., Cincinnati.
Jno. R. Chapin; Bureau of Illustration, Buffalo, N. Y.
James Spear; James Spear & Co., Philadelphia.
W. C. Higgins; Richmond Stove Co., Norwich, Conn.
P. B. Acker; The Union Stove Works, New York city.
W. T. Black; Black & Gormer, Erie, Pa.
Joseph Cox; Cox, Whiteman & Cox, Philadelphia.
J. Goldsmith; Brand & Co., Milwaukee, Wis.
W. Sanford; The National Stove and Furnace Co., New York city.
A. Bradley; A. Bradley & Co., Pittsburgh, Pa.
G. F. Filley; Excelsior Mfg. Co., St. Louis, Mo.
Wm. P. Abendroth; Abendroth Bros., New York city.
Andrew Albright, W. A. Green; W. A. Green & Co., Newark, N. J.
C. O. Green, Troy, N. Y.
Co-operative Stove Works, Troy, N. Y.

In addition to the names above given there were some fifty members of the trade present who did not respond to the roll call, as other representatives of their houses were already in the list.

General Rathbone then delivered the following

ADDRESS FROM THE CHAIR.

GENTLEMEN OF THE ASSOCIATION: In the printed report of the meeting of this association, held at Rochester last winter, the speaker is reported to have said: "I am confident that increased prosperity is to come to our country. The time is not far distant when the manufacture in which we are engaged will be as profitable as that of others of the great industries of this country. We have, as a nation, the balance of trade in our favor. Our exports are largely in excess of imports, and with the resumption of specie payments the business outlook will steadily and surely improve. I trust and believe that when we meet a year hence we shall have reason to congratulate ourselves upon the improvement in our business which is now predicted."

While it is not proposed, gentlemen, to claim the gift of prophecy, it would not seem inappropriate to most heartily congratulate you upon the fact that the opinions then expressed were correct, and that, after long years of depression and unprofitable business, the industry in which we are engaged has again become remunerative.

A sound conservatism, it is believed, will accept with much hesitation (if it accepts as truth) the extravagant expectations of many who predict prosperity in our great industries such as were never before realized. The increased price of almost every product would seem to have been too rapid and too great to be healthy and permanent.

The arguments advanced by the advocates of high appreciations of value are:

1. That the large amount of circulating medium, which has been enhanced by the addition of gold to our currency, makes our circulating $400,000,000 greater than it was at the highest period of inflation.

2. That the excess of exports over imports for 1879 is $200,000,000 greater than for 1878.

3. The report of the Commissioner of Agriculture, recently published, gives statistics showing that the value of the crops alone for 1879 exceeds the value of 1878 by more than $400,000,000.

While one may not be disposed to contradict these statements and admit the fact of a superabundant currency, it must be conceded that therein lies the danger. Immoderate speculation will be encouraged, which will, unless checked, prove as disastrous as those times which many of us remember. Most, if not all, of those present here, will probably agree with me in the opinion that the views advanced by President Hayes and the Hon. Secretary of the Treasury, with reference to the payment and withdrawal of legal tenders, are eminently wise. The policy, as well as the honesty of paying debts when we have the ability to do so, would scarcely seem to be a question open for discussion among intelligent men of business, when the legal tenders shall have been paid and these paper promises of the Federal government, which were called into being as lawful money only by the exigencies of a gigantic civil war, shall have been redeemed, then we shall in truth and indeed have resumed specie payments. The suggestions of the President, if adopted by Congress, would prevent the wild speculations which are invariably engendered by an inflated currency, and do much to render the business of this country stable and prosperous.

The present condition of the iron market is anomalous, and is a suprise to all, and especially to the makers of iron. While it is believed that speculation has had much to do with the sudden and sharp advance which has taken place within the last three months, it must be admitted that the new railways to be built and the general increase of manufactures in which iron is employed may create a demand so large that the suppy of domestic pig will prove inadequate. To what extent foreign iron will affect the price of American is uncertain, but it must not be foregotten that but a limited quantity of Scotch can be used in the manufacture of good stoves, that English irons from the Middlesboro district are reported as cold short, and that with high prices for American, foreign iron will proportionately advance. The opinion may here be hazarded that the price of good foundry iron will reach $45 before the 1st of May next. A much higher price is predicted by many. With the advance in pig iron is to be added a corresponding advance in rods, bolts, and almost every article used in our manufactures. These large advances are to be deprecated, but are unavoidable, and in view of them, the unpleasant duty of advancing the price of stoves to an amount equal to the increased cost of manufacturing becomes imperative.

The business of the year 1879 would have been much less profitable than it has been—although perhaps none of us have reason to complain that the profits were excessive—had it not been for the organization of this association and the personal efforts of some of its members. Your attention is directed to it, that we all may more fully realize its benefits.

In the autumn of '78, owing to the large supply and severe and needless competition, stoves—particularly cooking stoves—were largely sold below the cost of manufacture, and yet in the winter and early spring of '79 demoralization in prices to a very considerable extent prevailed, which threatened to become general and to render 1879 more disastrous to the trade than any which preceded it. It occurred to some members of the association from Albany and Troy to use the association to avert this disaster. They called together the members of the local associations of Albany and Troy, who agreed to a minimum price, if generally adopted, and at their own expense made two journeys, visiting Buffalo, Detroit, Chicago, Cleveland, Cincinnati, St. Louis, Pittsburgh, Philadelphia and New York. At those cities they met in consultation with the manufacturers. The result of their efforts was to establish prices and in the saving of a very large amount to founders, and made possible the advance in prices in the autumn with the increased cost of iron. We cannot but feel that the thanks of this association are due to these gentlemen for their gratuitous services, which contributed so largely to our common prosperity.

A feature of our business, which is becoming alarming, is the making of new patterns. Reference is not here made to stoves embracing new elements of excellence or beauty of shapes, but the habit of changing the dress of stoves already admirable in design and perfect in working, thus involving the expenditure of large amounts of money which should be saved. The example of the largest manufacturers in this respect must be imitated by all, or those failing to do so be obliged to sell unfashionable goods at reduced prices. The dress of the stove must be changed like the bonnets of the milliner, and it is suggested, if this habit is to be continued, that, like the milliners, our spring and fall "openings" be publicly announced. The evil, gentlemen, is a serious and a growing one. It is not confined to the cost of the new pattern, but to great loss occasioned by old stock, which must be sacrificed, and to the remelting of odd plates which always accumulate. But this is not all. It necessitates the carrying of a large stock by the manufacturer, which, before the era of such frequent changes in patterns, was borne by the dealers (they will not incur the risk of holding last year's patterns); and, too, the endless and vexatious trouble of describing repair plates when needed.

The question of the employment of convict labor is exciting general attention. The late very able Controller of this State, in his report presented to the Legislature, says: "It is not probable that any system which authorizes and demands the employment of convict labor will escape criticism from those who are affected by it. The plan which would probably provoke the least criticism is one which would provide for the employment of but a limited number of convicts in any one industry." The convention called by the Prison Association, held in this city last autumn, after full discussion, reached the same conclusion. It will be noticed that the principle involved in the opinion of this association, embodied in the resolution passed at our meeting held at Rochester last winter—"That not more than 10 per cent. of the total number of able-bodied convicts in any State should be employed in any one line of manufacturing industry," and which your Committee on State Prison Labor earnestly appealed to the Legislature of this State that it might become a law—has, after careful consideration, been adopted by the late Controller and the Prison Association as the most reasonable solution of the problem of convict labor. The suggestion is placed before you that measures be adopted at this meeting to urge the passage of laws in the different States in accordance with the spirit of the resolution of last winter.

In connection with this subject it may properly be said that it has been urged by many that laws be passed to so graduate and increase the wages of the convict, according to his skill and ability, that the disparity between his wages and those of honest workmen be less severe, thus securing to the prisons a larger profit.

The era of large profits in our business, such as marked the period from 1862 to 1873, has, in my judgment, passed forever. It must be conducted in the future at a smaller percentage of profit, and that will be secured by close attention to details and rigid economy. A more careful analysis of cost should be made. It must be conceded that too many manufacturers deceive themselves as to the actual cost by not including many important items, and among them that of selling their goods. The custom which has become general of disposing of our manufactures through the medium of traveling salesmen is an expensive feature of our trade, as added to the salary and expenses of this agency much of the unprofitable competition arises from the often unwise eagerness of the salesman to report large sales to his employers rather than those which are profitable. This competition can be modified by the employment of intelligent, capable traveling salesmen, by the adoption of definite instructions to which they must be rigidly held, and the refusal to consider statements as to prices of competitors unsupported by proof.

The laws for the collection of debts in the several States of the Union are so variable, and in some cases so crude and onerous, that a reform is greatly to be desired. Uniform State laws, or a wise general bankrupt law, free from the expenses and abuses of the old law, will soon be demanded by the business men of the country.

From the fact of the largely increased cost of manufacturing, and the uncertainty as to the future of the iron market, true wisdom indicates a policy firm but conservative, and it is confidently anticipated that the result of our present meeting will be the adoption of wise suggestions, that carried out will secure to the members of this association a fair remuneration for the capital and labor employed.

Mr. John S. Perry moved that the thanks of the association be extended to Gen. Rathbone for the very able and interesting address, and that the same be embodied in the published report of the proceedings. Carried.

Col. Warren moved the appointment of a committee of five to nominate officers for the ensuing year. The motion prevailed, and the chair named Messrs. Warren, Myers, Whitehead, Sard and Parlin.

Mr. Abendroth moved a vote of thanks to the gentlemen alluded to in the president's address, who last year canvassed the trade and by their personal efforts induced the advance in prices. Carried.

The secretary read the names of the following houses nominated for memberber ship:

W. A. Green & Co., Newark, N. J.
Sill Stove Co., Rochester, N. Y.
Co-operative Stove Works, Troy, N. Y.

They were elected.

Mr. Boynton moved the appointment of a committee to prepare an order of business for Thursday's session, and to consider the president's address. Carried.

The following gentlemen were named as such committee:

Mr. Perry, Mr. Filley, Mr. Boynton, Mr. Tefft, Mr. Resor and Mr. Fuller.

Mr. Barbour moved a reconsideration of the resolution naming New York as the future place of meeting.

Pending the discussion of this motion, the committee on nominations returned, and Mr. Whitehead made the following report:

Your committee, appointed to nominate officers for the ensuing year, respectfully report as follows:

President, Gen. John F. Rathbone.
1st Vice-President, R. P. Myers.
2d Vice-President, G. F. Filley.
Treasurer, A. Bradley.
Secretary, Edward Bowditch.

BOARD OF MANAGERS.

John S. Perry.
W. H. Tefft.
Isaiah Jewett.
I. B. Resor.
W. P. Abendroth.

STANDING COMMITTEE ON PATENTS.

Isaac A. Sheppard.
Chas. A. McLeod.
Miles Pratt.
G. G. Wolfe.
J. L. Mott.

Gen. Rathbone, Mr. Bowditch and Mr. Bradley asked to have their names withdrawn, but their objections were overcome and the ticket as nominated was elected, Mr. Mott casting the ballot for the association.

Mr. Bradley, treasurer, reported the association solvent, with a small balance in the treasury after paying all bills.

The Committee on Papers were then called upon to report, and the following paper on

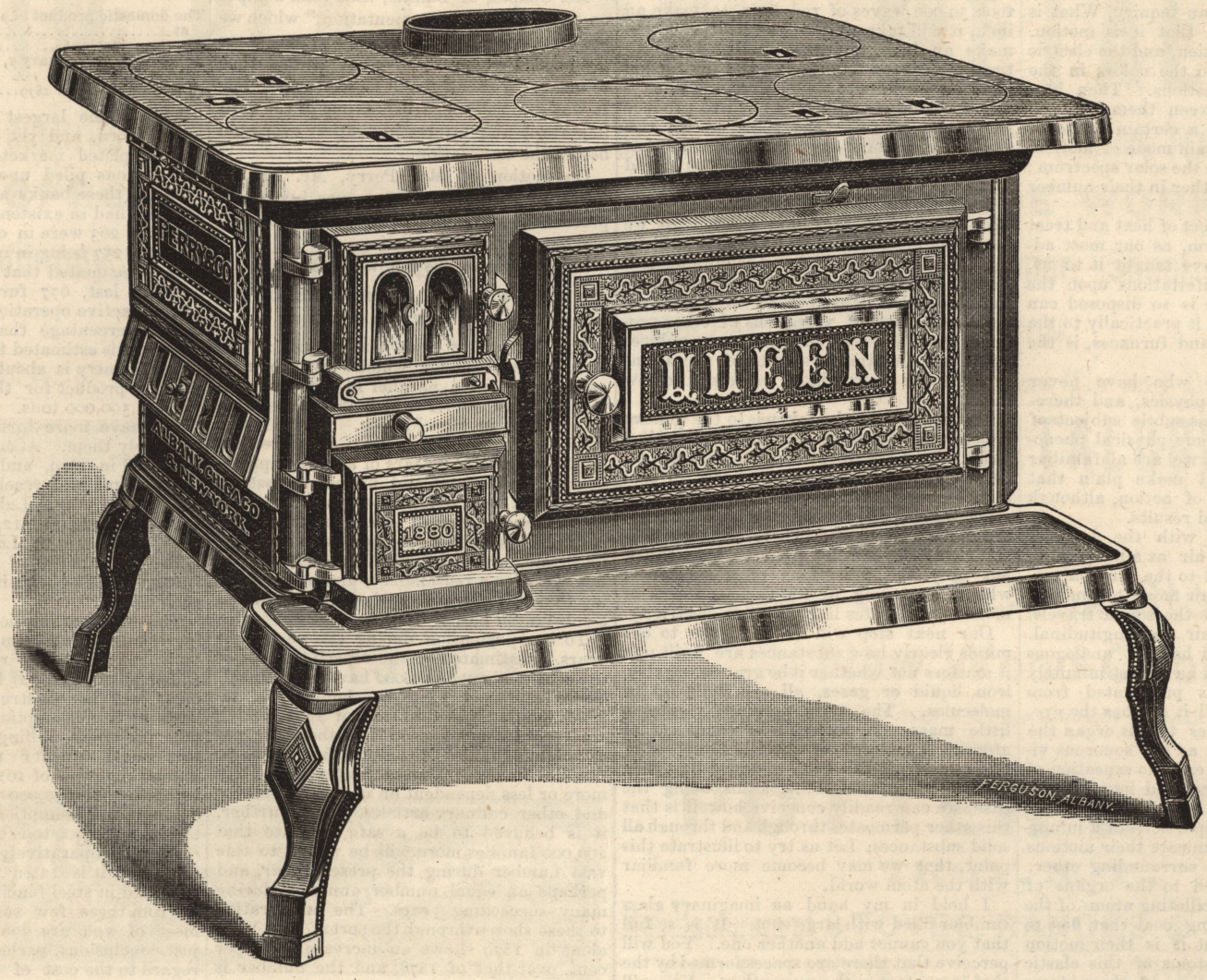
THE PHYSICS OF HEAT

was read by Mr. Bayles for the absent author, at the request of the association:

Longinus, the secretary of the Queen of Palmyra, in his treatise upon the sublime, said that the grandest words ever uttered,

THE FIRST NEW PATTERN FOR 1880.

THE HANDSOMEST RANGE OF THE CLASS IN THE MARKET.



THE QUINCY.

SINGLE OVEN,

SAME WITH CLOSET,

SAME WITH RESERVOIR.

An improved "Pouch Feed" for soft coal. Extra large flues and a perfect draft in the poorest chimney. A splendid baker. Every Range guaranteed.

PERRY & CO.,

NEW YORK CITY. ALBANY, N. Y. CHICAGO, ILL.

magnificent in their unrivaled simplicity, was uttered by one whom he called an obscure law-giver, and these are the words that he refers to: "And God said let there be light, and there was light." It is through the agency of light and heat that all life, both vegetable and animal, is supported. I find it difficult to treat of one without speaking of the other, for there seems to be such a similarity in their methods of manifestation that I look upon them as being twin sisters.

When we put forth an inquiry, What is heat? we are answered that it is motion. We say that light is motion, and the electric light is motion, and also the colors in the solar spectrum are motions. Then how shall I distinguish between them? I will answer that heat has a certain mode of motion, and light a certain mode of motion, and so have the colors in the solar spectrum; they differ from each other in their number of vibration per second.

Now, to take the subject of heat and treat it in its elementary form, as our most advanced philosophers have taught it to us, and so impress its manifestations upon the mind that any one that is so disposed can manipulate it and apply it practically to the construction of stoves and furnaces, is the object of this paper.

There may be those who have never studied this branch of physics, and therefore in order to grasp this subtle subject of heat, we will take some physical phenomena the laws of which we are all familiar with, to illustrate and make plain that which has a similarity of action, although differing in elements and results.

We are all familiar with the laws of sound. Sound has the air as a medium by which to be transmitted to the ear of a person. The particles of air move to and fro in the direction which the sound travels. The undulations of the air are longitudinal. Huygens supposed light had an analogous oscillatory movement in an almost infinitely elastic ether, which is propagated from particle to particle until it reaches the eye, and that it communicates to this organ the sensation of vision, just as the sonorous vibrations produce in the ear the sensation of sound, and now it is accepted by all of our philosophers that light consists, first of a vibratory motion of the particles of a luminous body, which communicate their motions to the particles of the surrounding ether, and so are transmitted to the organs of sight. It is not the oscillating atoms of the lighted candle or burning coal that flies to our organs of vision, but it is their motion communicated to the atoms of this elastic ether, and it is the motion of these atoms that impinge upon the retina of the eye, and announce themselves to our consciousness as light.

Gentlemen, you may think that I am too profuse in my illustrations and analogies, but my object is to be thorough and leave no wrong impressions, for there has been much talk about heat and stove construction that is unwarranted by well-conducted experiments—so much bosh that has been written and strewn broadcast, that I wonder why the mad bull has been let loose in the crockery shop. Now let us return to the phenomena of sound, and try to trace in their manifestations some analogy to those of light. If we stretch a wire and cause it to vibrate, we set in motion the particles of air next to the string. You will understand that, as it bounds forward, it must crowd the particles of the air before it into a smaller compass. In other words, the vibrations of the air produce a condensation on one side of the string and rarefaction on the other. These waves travel with a velocity of 1100 feet per second and are called sonorous waves. The length of these is measured from the center of one condensation to the center of the next one.

It will be evident to you that the greater the rapidity of vibration the shorter will be the wave of condensation and rarefaction, on which depends the intensity of the sound. You are acquainted with the fact that a violinist, whenever he wishes to produce a high note, presses his finger on the string nearer the bridge, and thereby augments the vibrations. Now, the lowest sound that can be heard requires 32 vibrations per second, and the highest is from 10,000 to 12,000 per second. With these considerations, we are prepared to consider the manifestations of light, and here you will observe the analogy between the manifestations of sound, light and heat.

If a ray of sunlight, or white light, as it is called, be made to fall upon a prism, it is decomposed, and as it emerges from the prism and falls upon the screen, it is no longer a single ray, but is separated into single colored rays, forming a brilliant band of individual colors blending gradually one into the other. Beginning at the lowest color, which is a beautiful dark red, this passes imperceptibly into orange, and the orange into a bright yellow; then a pure green succeeds, which is shaded off into a brilliant blue, and this gives place to a rich deep indigo; a delicate purple leads finally to a soft violet. Here the visible rays terminate. Some one has said the solar spectrum is to the eye what the gamut is to the ear. You will remember that I said the colors in the solar spectrum have a certain mode of motion; and so we find that the dark red in the solar spectrum has a longer vibration, consequently a slower vibration than the violet. The truth of this remark is substantiated by the fact that it takes 39,000 of red waves to make up an inch. As light travels through space at the rate of 192,000 miles per second, it follows if we will reduce the 192,000 miles to inches and multiply them by 39,000, we shall have the number of waves that must enter the eye per second to produce the impression of red. To produce the impression of violet we must have a greater number of vibrations; whereas it took 39,000 waves of red light to make an inch, it will take 57,500 waves of violet to make an inch, and the number of vibrations per second to produce the impression of violet amounts to six hundred and ninety-nine millions of millions, and so to produce the other colors in the spectrum we rise gradually in vibrations from the number that it takes to produce the impressions of red up to the violet.

Now, we are prepared to enter more fully upon our subject, heat, and from what we have said about sound and light, it will be more readily understood and comprehended. For it has been found that heat obeys the same laws that light does, so when we say a certain number of vibrations of ether produces heat, and a further increase produces light, and the utmost rapidity of vibrations produces the electric light, we record no new fact.

The next step to be taken is to try to have a clear conception of the substance called ether. This highly attenuated matter, imperceptible to the senses, permeates all substances, whether liquid or solid, and fills all space way beyond the star worlds and makes the universe a whole. Therefore, light heat and electricity are not separate substances, but only the vibrations of a substance, which, according to its various forms of motions, generates light, heat or electricity.

Our next step will be to figure to our minds clearly how substances are built up; it matters not whether it be granite, marble, iron, liquid or gases, all are built up of molecules. The term molecule means a little mass. A molecule is composed of atoms. A molecule of water is composed of two atoms. It has been assumed that they do not touch each other; this being the case, we can readily conceive how it is that this other permeates through and through all solid substances. Let us try to illustrate this point, that we may become more familiar with the atom world.

I hold in my hand an imaginary glass tumbler filled with large shot. It is so full that you cannot add another one. You will perceive that there are spaces formed by the shot in contact with one another. You will readily understand how it is that you can put into that tumbler, which is already full, a quantity of sand, from the fact that the sand is made up of finer atoms, which will lie in the interstices or spaces between the shot. We will empty the tumbler and fill it with water. Now, to all appearances there are no spaces to be filled; all appears compact and smooth, but it is not so, as I will show you, for I can pour quite a quantity of alcohol into this tumblerful of water. How are we to account for this unless the alcohol is composed of finer molecules, which it is, and they lie in between the spaces formed by the coarser molecules of the water. I believe I have made it plain to your minds how it is that this ether fills or permeates all substances. Notwithstanding this fact, there are substances that are opaque to light and to heat, and there are substances that are transparent to the waves of heat, such as air and rock salt. This is to be accounted for in this way: the heat waves pass through this rock salt crystal without transferring its motion to the atoms of the crystal.

What is radiant heat? Radiation of heat strictly defined (says Tyndall) is the communication of motion from the particles of a heated body to the ether in which these particles are immersed. Let us apply this practically. We will construct a cylinder stove, with a firepot removed from the walls of the body of the stove, and light our imaginary fire, and then see if we can appreciate what is going on in the stove and on the outer side. Our coals are all of a bright glow, the atoms of that ignited coal are oscillating rapidly; this motion (according to the definition) is communicated to the atoms of the ether, and this ether permeates through the stove; the vibrations of this ether extend in all directions from the fire or burning coal. Are the motions carried through the walls of that stove? or are the walls of that stove opague to the vibrations of that ether? Undoubtedly the motion extends through, but not intense by enough to produce heat (appreciable), but the waves impinge against the molecules that make up the body of the stove, and they become the centers of oscillation, and communicate their motion to the surrounding ether, which transmits it to the surrounding objects in the room when it becomes absorbed. Now comes an important point in constructing the outer walls of our heating stoves. What direction do the ether waves take from the outer face of walls of the stove? They move in right lines from the outer face of the walls. It is greater in proportion as the rays are emitted in a direction more nearly perpendicular to the radiating surface. I find my article is quite lengthy in considering what heat is and some of its laws. I would like to apply it to stove construction, which I trust I may be permitted to do at some other time. I must leave many essential points undiscussed that should come under the head of heat and its radiation.

B. F. HOLBROOK.

Mr. Sard moved that the thanks of the association be tendered to Mr. Holbrook for his paper, and that the same be spread upon the minutes. Carried.

Mr. Chapin, of Buffalo, then read a paper on "Art in Stove Ornamentation," which we are unable to print this week, as engravings are needed which we have not yet had time to make. We shall give it as soon as possible. It was generally regarded as one of the most important and interesting papers ever read before the association.

On motion of Mr. Perry, Mr. Bayles, Editor of *The Metal Worker*, was invited to present his views on this subject at his convenience during the meeting.

Mr. Perry read the following paper on

THE COST OF STOVES AND THE OUTLOOK FOR THE STOVE TRADE.

MR. PRESIDENT AND GENTLEMEN: The circumstances under which we are now assembled form a parallel in some particulars to those under which this association was formed in March, 1872. There is this marked difference, however: we were then on the verge of six years of almost unprecedented commercial and financial disaster, while it is believed that we now have entered upon a series of years of great prosperity. However this may prove in the long, uncertain future, I think in our action of to-day we have a reasonable warrant in assuming that this new activity is genuine, and has a substantial basis.

To our population during the past eight years, as estimated by the superintendant of the census, about 8,000,000 have been added. These represent 1,600,000 families, a no mean number added to that of 1872, which was recorded as 8,000,000. It is, therefore, not a "flight of fancy" to assume that 9,600,000 families in these United States are to-day more or less dependent on us for their stoves and other culinary articles. And, further, it is believed to be a safe estimate that 200,000 families more will be added to this vast number during the present year, and perhaps an equal number annually during many succeeding years. The immigration to these shores through the port of New York alone in 1879 shows an increase of 70 per cent. over that of 1878, and the number is still increasing.

The area of our agriculture during the past eight years has extended not less than 30,000,000 of acres, and it is fair to assume that 4,000,000 of acres in addition will be brought under cultivation annually during the present and succeeding years. The products of our soil have been almost fabulous in amount, and we may look with a reasonable certainty to a gradual increase in the same.

Our domestic manufactures are rapidly enlarging, and are growing in favor with foreign nations. The mountains continue to yield rich returns to the labor of the miner and give no indications of exhaustion. The South is rapidly recuperating, and opens to us an ever-widening market.

Our system of railways is being rapidly extended, consuming vast amounts of iron and opening to settlers untold acres of virgin soil. Vast treasures of gold are being showered upon us by foreign nations in payment for our products, thereby increasing our wealth and hastening the day when this Empire City shall be the financial center of the world.

What have we to place upon the dark side of the picture? We may anticipate disasters to our crops, an absence of foreign demand, financial difficulties, war or pestilence, and it is a mark of wisdom to keep in mind such possibilities and to be prepared for them; but it is not, in my judgment, a mark of wisdom to be always anticipating disaster, thus crippling our energies, when there is every reasonable indication of prosperity.

Another marked difference between our present condition and that of 1872 is in the relative prices of iron during the eight years preceding each epoch. From and including 1864 to 1872 the yearly average price of No. 1 foundry iron ranged from $59.25 to $33.25, the total average for those eight years being $43.08

From and including 1872 to 1880, the same iron ranged, by yearly average, from $48.88 to $17.63, the total average of those eight years being $28.27. The average during the former epoch was 52.4 per cent. higher than during the latter. For 22 years prior to 1864 the annual average cost ranged from $20.25 to $36.88, or a total average during those years of $26.42.

During the last 38 years the annual average cost has been:

At $20.00 and under during	2 years.
Above $20.00 and under $25.00	11 years.
Above $25.00 and under $30.00	10 years.
Above $30.00 and under $35.00	3 years.
Above $35.00 and under $40.00	5 years.
Above $40.00 and under $45.00	3 years.
Above $45.00 and under $50.00	3 years.
Above $50.00 and under $55.00	0 years.
Above $55.00 and under $60.00	1 year.
	38 years.

The lowest yearly average during this time was in 1878, which was $17.63; the highest in 1864, when it reached $59.25.

	Tons.
The product of our blast furnaces in 1872 was	2,300,000
The importations that year were	193,957
Total	2,493,957
The domestic product of 1878 was	2,301,315
The importations	66,503
Total	2,367,818
The domestic product of 1879 is estimated at	2,800,000
The importations	275,000
Stock on hand January 1, 1879	513,000
Available stock for 1879	3,588,000

This is the largest supply for any year upon record, and yet we enter upon 1880 with depleted markets. Instead of some 40,000 tons piled upon the banks of the Hudson, these banks are literally bare. In 1878 we had in existence 712 blast furnaces, of which 263 were in operation; in 1879 we had 690, 257 being in operation.

It is estimated that we had, on the 1st of January last, 677 furnaces, and that 384 were in active operation, the same being a larger percentage than at any time since 1875. It is estimated that the total capacity of the country is about 6,400,000 tons, and that the product for the present year will reach 3,500,000 tons.

We have more furnaces than visible ore to supply them. About 300,000 tons were imported in 1879, and it is estimated that the amount will reach 500,000 tons during the present year. Lake Superior ores, I observe, are held at $12, delivered in Cleveland, and $15 in St. Louis. To this must be added the expense of transportation to the furnaces. No cheap iron can be made at such cost.

That the consumption of iron is rapidly increasing, no one can doubt. In 1872 we built 7623 miles of railway; in 1879 we added 3700 miles. It is estimated that 7000 miles will be constructed in 1880. On a basis of a consumption of 150 tons to the mile for track, rolling stock and fixtures, this would call for 1,050,000 tons. The annual renewals of 101,455 miles of track is estimated at 650,000 tons, showing a total estimated consumption for our railway system of 1,700,000 tons of iron for 1880.

As a comparatively new article of consumption, it is stated that 20,000 tons was absorbed in steel fencing wire in 1879.

From these few suggestions, with which most of you are doubtless familiar, some just conclusions, perhaps, may be formed in regard to the cost of iron for the year. I do not think it safe to base our action upon any sum below $35.

For some years prior to 1872 the prices for stoves were unremunerative. In March of that year, when we held our first convention, iron was $40 and advancing. We established our prices at 7 cents, 7½ cents, and 8 cents per pound, and during two years they were fairly maintained. The losses of the past were regained, and the trade appeared to be again established on a good foundation; but the disasters of 1873 came, and five unprofitable years of depression followed.

We are now somewhat in the same condition as in 1872. Profits have been light, iron is $40, with an upward tendency, and we are now gathered together to decide for the future.

In respect to the cost of stoves, I hesitate to add another word to previous statements, fearing that the manufacturers of the country are tired of them. I will, however, quote from my address in 1872, the truth of which has been confirmed by a further experience and observation of eight years. I then said:

"I believe the average cost of the cheapest grades of stoves in 1871 was not less than $115 per ton, and from that to $130 or $135, according to the kind and quality; and that during the present year (1872), estimating iron at $40, which is considerably below the present quotations, the cost will range from $120 to $140."

I have failed to meet the first manufacturer who, after a careful examination of his books at the end of the year, has not corroborated this general statement.

At our last meeting, held in Boston in June, I was called on to explain my statement "that in 1843 a profit was realized at 2¾ cents with iron at $25; while with iron at $18 in 1879 I believed there was ordinarily no profit at 5 cents."

I did not at that time have the figures, and was unable to reply with much exactness. With the permission of the meeting, I will now answer the question more fully.

	1843.	1879.
Allowances of various kinds	$0.20	c.75
Advertising, catalogues, circulars and other printed matter, wood cuts and electrotypes	.25	2.25
Bad debts	1.00	2.50
Coal for melting, making steam and heating	2.50	1.75
Cupola men, breaking iron, wheeling, &c	.50	.80
Charcoal and wood	.15	.20
Clerks	.75	2.00
Cartages	.15	.25
Commercial travelers and expen..	.15	2.50
Castings discarded	.40	1.50
Costs and legal services	.10	.20
Cleaning, weighing, examining and piling castings	.75	2.00
Engineers	.15	.25
Facing	.80	1.20
Freight	.30	.50

PHELPS, DODGE & CO.,

Nos. 11 & 13 Cliff Street, NEW YORK.

TIN PLATE AND METALS.

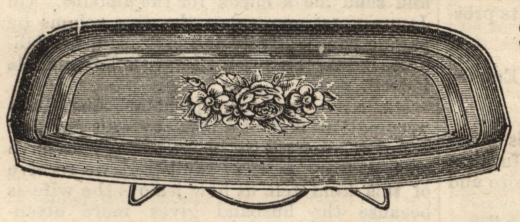
ALL SIZES AND QUALITIES OF CHARCOAL AND COKE TIN PLATE. EXTRA QUALITY STAMPING PLATE. ROOFING PLATES, ALL GRADES.

SPECIAL BRANDS OF ROOFING FOR CHOICE WORK.

Pig Tin, Antimony, Lead, Spelter, Sheet Zinc, Ingot Copper, Sheet Copper, Sheet Brass, Wire,

RUSSIA SHEET IRON, COMMON, CHARCOAL AND POLISHED IRON.

Solder of Superior quality. Taggers Tin and Iron.



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FOR CHILDREN.

MANUFACTURED BY

NEWARK TEA TRAY COMPANY,

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Send for price lists and discounts for full line of Oval Tea Tray

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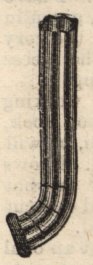

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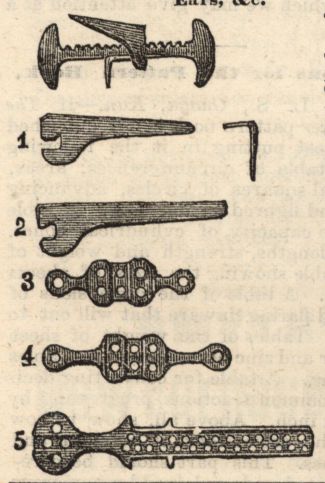

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CEMENT

STOPS ALL WATER LEAKS

On roofs of all kinds, around chimneys, copings, skylights, joints and seams in wood and iron, laying slate roofs, copings, and any place required to be made water tight. Ready for use with trowel; does not crack, chip off or run. Price, in tubs and barrels, 5 cents per pound. Special rates by quantity. Cans for family use, retail, $2.40, $4.20 and $7.20 per dozen. 25 per cent. off.

Champion Stove Cement, composed of fireproof ingredients, ready for use, is the best ever manufactured for cementing seams and joints in stoves and mounting the same. Price, 4 cents per pound, in kegs and barrels. Special rates by quantity. 15-lb. can sent for $1.

Iron Ore Furnace Cement, for setting furnaces and packing joints in same, making them gas tight. Forms like iron, and contains no oil. Prices in 5 and 12-lb. cans, packed, 50 pounds upward, 8 cents per lb. Special price in barrels. 12 lb. cans sent for $1.

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The adoption of the **STERLING CHEMICAL WICK** by any make of stove will largely increase its sale. The wick need not be touched oftener than once in one or two months, and does away with odor, smoke, trimming and cinders.

Extract from one of the many letters of commendation we have had from experts.

FLORENCE, MASS., Dec. 22d, 1879.

We are ready to concede that the wicks are all that you claim for them. We shall use this wick *entirely* for the Florence Oil Stove for 1880.

H. P. DIBBLE, Treas.

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N. B.—No connection, past or present, with any Red Felt or so called "Perpetual" Wick.

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All kinds of Patterns belonging to the stove trade made to order.

JOHN HARE. HENRY B. DEGENAAR

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New Ranges,

New Coal Cook Stoves,

New Wood Cook Stoves,

Will be ready about February 10th. We are confident we shall show the trade **new** and **novel** features in Ranges and Stoves.

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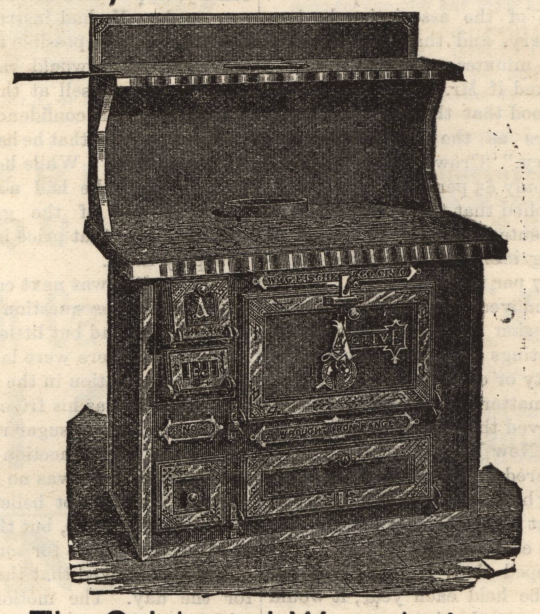

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Winthrop Furnace, Winthrop Range, Winthrop Base Burner, Winthrop Oval Parlor, Winthrop Air-Tights and Cottages.

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Flux	.30	.15
General labor	1.20	2.00
Gas and oil	.25	.35
Iron	25.00	18.00
Insurance	.30	.60
Interest and discount for cash	2.70	5.00
Molding, including foreman, and more or less day work	8.00	24.00
Mounting, including foreman and more or less day work	2.00	10.00
Machinery	.10	.25
Postage	.15	.50
President and secretary	1.20	2.00
Patent fees and legal expenses relating to same	.20	.50
Patterns and flasks and repairs on same	1.00	7.00
Rods, bolts, wire, malleable iron, scrapers, cement, wood handles, tin and copper work, plated knobs, &c	1.10	5.00
Repairs of buildings, machinery, cupola, &c	.25	.75
Rents and taxes	1.00	3.00
Sand and clay	.40	.50
Stationery and books	.20	.40
Sundry, freight, expressage and telegraphing	.10	.45
Sundries, including stealings and petty losses and expenses of various kinds	1.00	1.60
Traveling	....	.50
Tools, files, grindstones, emery-wheels, belting, &c	.60	2.50
Watchman	.25	.30
Total	$54.80	$104.00

The statement of 1843 shows a cost of about 2¾ cents. I well remember that our prices for stoves that year ranged from 2⅝ to 3¼ cents, and that we made a satisfactory profit.

The statement of 1879 shows that with iron at $18, our stoves cost $104. It is my opinion they cost more, taking the contingencies of one year with another. With iron at $35, stoves will cost the present year $121. With iron at $40, they will cost $126, and this without adding much for the advance in other things. The minimum price for stoves should be 7 cents for the lowest grades, with the cost of the mountings added and a reasonable profit on the same. But as the country may not be ready for so large an advance, I suggest that the price be established at 6½ cents, leaving it for manufacturers to arrange the prices of better qualities at their discretion. That the discount on hollow ware be 35 per cent., and the charge for repairs 8 cents.

These questions of cost and price are really all of any special importance that call us together. I trust that a full expression may be given to them by every member at this meeting.

Mr. Fuller paid a high compliment to Mr. Perry's accuracy, and to the value of his views as presented in the papers he had read before the association, and said that he considered this one, perhaps, the most interesting and important of any to which the association had listened. He moved that the thanks of the association be tendered to Mr. Perry, and that his paper be spread upon the minutes. Carried.

Mr. Spear asked if Mr. Perry had meant it to be understood that the cost of nickeling such stoves as the "Westminster," "Crowning Glory," "Crown Jewel," "Splendid," &c., was only $5 per ton.

Mr. Perry replied that the average cost of material which enters into the mounting of stoves, nickeling included, exclusive of labor, is about $17 per ton.

Mr. Barbour moved that the association give an expression of its opinion as to whether its meetings shall be held hereafter in New York city or elsewhere.

To bring the matter before the association, Mr. Ramsay moved that the meetings hereafter be held in New York city.

Mr. Perry offered an amendment, that the place of meeting be determined as heretofore, and that the best places be selected for the next meeting at each session.

Mr. Filley hoped that, if there was but one meeting to be held each year, it would be held at some central point.

Mr. Spear said the present was the largest meeting he had ever attended. He thought that a large city like New York was the only suitable place for the meetings.

Mr. Perry stated that the object of the association was to bring into the membership every stove founder in the country. If the meetings were always to be held in New York, he was sure there were many who would never be seen at them.

Mr. Mott said that he fully agreed with Mr. Perry, but for very different reasons. He could see no reason why he and his New York friends should not have a chance to go away from home once in a while for a good time as well as the Western fellows. He had already been asked by a number of the latter if he could not take them somewhere, and while he did not profess to be a good New York pilot, he thought he could show them something but he would like them to be put in a position where they could return the compliment. Mr. Perry's motion was then carried without further discussion.

Gen. Rathbone called attention to the fact that the subjects treated in Mr. Perry's paper were of the greatest interest and importance. He hoped, therefore, that they would be fully and freely discussed.

Col. Warren asked why Mr. Perry held the opinion that he expressed that the country was hardly prepared for an advance in prices of stoves above 6½ cents as a basis for common goods. Other manufactures of iron and castings had advanced in proportion to the cost of iron and labor: hardware, locks, wire and nails, and nearly all the other products of iron had advanced in some instances more than 100 per cent. Why should not the stove men get as good prices as others in proportion to the cost of material they consume and the labor they employ.

Mr. Perry replied that in his judgment the same conditions did not obtain in the case of stoves as in other manufactures of iron. He feared that if the cheaper grades of stoves were advanced to seven cents it would check the demand, inasmuch as there is no disposition on the part of the dealers to purchase stoves in a speculative way. Again, many feared that the price of iron would not be sustained, and should it decline, buyers would demand a reduction in the selling prices of stoves to correspond. He thought it much better that they should ask prices which could be maintained. He asked for Mr. Filley's views upon iron.

Mr. Filley, in reply, said that his opinion was good for nothing. He had been mistaken right along from the first, and no doubt was mistaken still. He did not see how prices could be sustained, but they have been sustained, and, therefore, he felt that his judgment in the matter was utterly worthless. Mr. Mott was next asked for his views upon the subject of iron.

Mr. Mott replied that probably he would be regarded as prejudiced in favor of higher prices. The position of the trade to-day reminded him of an old saying, that "If one's foresight was as good as his hind sight, his judgement would be better by a d—d sight." It had always been his policy to buy iron in excess of his requirements. He had done so every year, and for several years past had lost money by it. It happened, however, that he had a large stock of iron on hand when the boom struck him and he was happy to say it struck very comfortably. It did not hurt in the least. He thought that we were about to have three or four years of the most prosperous business the country had ever seen. Personally, at present, he had no desire to sell any goods. He had instructed his salesmen to sell as little as possible and to send out no travelers, as he would rather hold for an advance than to sell at the best prices now obtainable. His confidence in the future of iron was so great that he had bought up to $38 on speculation. While he had considerable iron on hand, he had none for sale under $45. If any of the gentlemen present wanted any at that price he should be happy to supply them.

Mr. Bradley was next called upon for his views upon the question of iron, and replied that he had but little to offer. He had learned that there were large stocks of iron held on speculation in the East, not only by such operators as his friend, Mott, but also by dry goods men, sugar refiners and others who have no connection with the trade. In the West there was no stock of iron anywhere. He did not believe that pig iron would go above $40, but that it might stay at about that figure for some time.

Mr. Mott moved that the meeting adjourn for the day. The motion was, however, withdrawn for a moment while the secretary read a letter from the Buck Stove Company, regretting the inability of Mr. Buck to be present at the meeting, and wishing the association a harmonious and profitable session.

Mr. Ramsay said he had listened with great interest to the discussion so far as it had proceeded, and thought that it was somewhat abruptly terminated. The question of prices was, in his judgment, the most important now before the trade. If it is true, as has been asserted, that iron is now selling at $45, and is going to be kept anywhere near that figure, the trade has no time to lose in making preparation for meeting the advance. In that event he considered Mr. Perry's recommendation of a 6½ cent basis, based upon iron at $35, not altogether too low. However, as it was late in the afternoon, and as the members manifested no disposition to prolong the discussion, a motion to adjourn until 10 o'clock on Thursday was carried.

THE DINNER AT DELMONICO'S.

At seven o'clock on Wednesday evening about 50 members and their friends assembled in one of Delmonico's parlors, and after the customary *mauvais quart d'heure*, the music struck up a march, and the doors were thrown open, disclosing an elegant table. The dinner was all that could have been expected from Delmonico, and if the guests were rather solemn, it was probably because pig iron was crowding $45, and the molders in some parts of the country manifesting a spirit the reverse of placid. With the coffee and cigars came the real fun of the evening—the toasts and responses. It is understood that nothing which happens at the dinner is to be reported, and the Editor of *The Metal Worker* would be the last to violate this understanding, for reasons of his own. If he gave the others away, somebody might "give him away." However, it will be no violation of confidence to give a list of some of the toasts:

The City of New York: May it always have a welcome for young men from the country.

Response by Mr. Jordan L. Mott.

The Stove Trade: May it always have favoring breezes, and its "boom" never "jibe."

Response by Mr. Isaac A. Sheppard.

High Art: May its canons yet recognize the decorative value of horizontal stripes in two colors.

Response by Mr. John S. Perry.

The Metal Worker: May some one invent a damper with which to *check* its *drafts*.

Response by Mr. J. C. Bayles.

The East: May the rising sun of its prosperity never set.

Response by Mr. W. H. Tefft.

The West: Whither the Star of Empire takes its way.

Response by Mr. U. Hill.

The Traveling Salesman: May his characteristic virtues of modesty, truthfulness, economy and self-abnegation shine more and more unto the perfect day.

Response by "Jeems, the Blackener."

Peace and Good-will: May brotherly love prevail, and strife and contention remain unknown in the stove trade.

Response by Mr. James Spear.

Nickel and Frills: May they go hand in hand where stoves are unnecessary.

Response by Mr. Grange Sard, Jr.

Clams.

Response by Mr. A. N. Parlin.

The Freight Lines: God bless them.

Response by Mr. Josiah Jewett.

Philosophy, in its relations to the stove trade.

Response by Mr. W. H. Whitehead.

The City of Albany.

Response by Mr. Nathan Perry.

There were a number of others equally good, made funny by the grotesque impropriety of their assignments, and as none of the gentlemen called upon to speak had received notice, they talked rather wide of the mark. Mr. Reid and Mr. Bowditch favored the company with good songs, and at a reasonably early hour the party broke up with "Auld Lang Syne," sung with a will and terminating with a wild *can-can* around the table. Then all marched straight—that is, nearly straight—back to the hotel, and sought in refreshing sleep the rest which the fatigue and excitement of the day had rendered necessary. The dinner was a success, and though but few of the stove fraternity would claim much talent for post-prandial oratory, there was a good deal of fun.

Paraffine on Wooden Ware.

From TINKER, *Mott Haven, N. Y.*—I have been trying some experiments with paraffine which I think may be of interest to you. I took a wooden pail for the subject of my first essay with paraffine, and resolved to give it a coating inside. I bought a pound of hard paraffine wax of a druggist, for which I paid 35 cents. I then took an old hammer head, which I had heated hot enough to melt the paraffine, and began melting the latter into the pail so as to cover the whole surface. When I had got the inside pretty well coated I heated the iron again and went over the inside, so as to melt the paraffine and allow it to soak in. This worked pretty well, but I did not get the coating as even as I could wish, nor did I get it soaked as well into the wood as it should have been. The result, however, was in some respects satisfactory. The pail was made water-tight, and does not show any signs of shrinking. It will not answer, however, for hot water, as paraffine melts at a point below the boiling point, and when hot water is put in the pail it floats off upon the surface in drops like grease. This, of course, makes the use of the pail for hot water impracticable until I have had a chance to clean the extra paraffine off, when, I suppose, there will be no further trouble. The putting on should be done out doors, because if the iron is heated too hot the paraffine is likely to burn and cause a very bad smell. I should think that for a cold-water tank it would be a very good thing if the staves could all be soaked in melted paraffine before they were put together. If I fix up another pail in this way I shall try coating outside, and I shall also try and have the wood perfectly dry, in order that the paraffine may penetrate into the pores. In this way I hope to make the pail hold hot water.

The Babies Cry for It.—The Index.

From W. F. M., *Brooklyn, N. Y.*—We appreciate *The Metal Worker*. It's like "soothing syrup"—the children cry for it. Our baby wants it as soon as it comes—calls it "Mrs. Potts' paper," and quotes all the legends attached to those enterprising specimens of high art published weekly; looks up all the tickels (tea kettles), then turns it over to her mother, who picks out of it many useful household and sanitary hints. By the time it reaches me it has become quite one of the family. I study it closely and then put it on file.

Now, a suggestion: Did you ever see a Yankee who didn't think he could edit a paper? I think if I was editor of *The Metal Worker* I could improve it by providing an index. Next year I shall want to refer to a hundred items in the volume now curren.. Calculate the valuable time I will lose in searching through the files for it, and send me a check for the amount. On January 1st commence the new volume by paging consecutively and making up an elaborate index. Then I shall have a file valuable indeed.

Answer.—Our correspondent must be a very patient sort of a man to wait for *The Metal Worker* till the baby and his wife have each had it. Most of the letters we receive of this kind tell us how jealous the wife is because the husband gives more attention to the paper than to her. Perhaps W. F. M. is wise in his day and generation, and, therefore, avoids the rock on which others have been wrecked. As to the index, we have already announced one for this year. We do not find it best, however, to page a volume as our correspondent suggests. We issued one year in that form some little time ago, but did not find it sufficiently desirable to warrant continuing it. The index will refer to the numbers by date, specifying the pages therein, which will, from experience, we believe, answer all requirements.

Full Size Patterns—How to Lay Out an Oval or Ellipse.

From C. O., *Cadiz, O.*—I could not do business without *The Metal Worker*. I have just tried the rule for jump elbows, given in the issue for December 6th. It is the very thing I have been looking for. The pieces went together without any trimming.

I am not in favor of full size working patterns. Let any one have a good book, and from it, with a little practice, he will be able to cut any pattern required. Elbows have always been the hardest for me, but I have mastered that idea now, and can cut any elbow or T that may be wanted.

I desire to inquire how to lay out an oval or elliptical figure. I don't remember to have seen anything of the kind described in a paper.

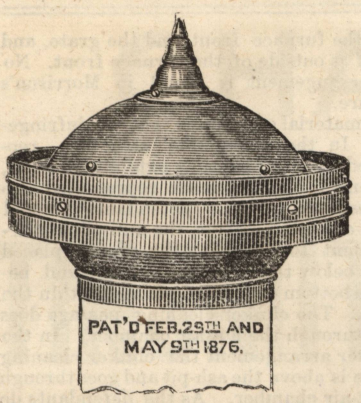
Answer.—We are glad to know that even one of our correspondents has found our special rule for jump elbows desirable.

We have already given so much attention to the matter of ovals or ellipses, that it seems hardly necessary to open up that question again at this time. We refer our correspondent, therefore, to *The Metal Worker* of the following issues, as containing just what he wants. November 23d, November 30th and December 14th, 1878; February 15th and March 8th, 1879. In these numbers we published a series of articles in the Young Mechanic's column, entitled "The Ellipse or Oval," which contains a number of points that we judge will be of interest to him. There are other rules for drawing the figure besides those there published, to which we may give attention at a later day.

Suggestions for the Pattern Book.

From H. L. S., *Onaga, Kan.*—If *The Metal Worker* pattern book is not published yet I suggest putting in it the following tables: A table of circumferences, areas, side of equal squares of circles, advancing to tenths and figured in decimals. A table showing the capacity of cylindrical cones. A table of lengths, strength and weight of wire. A table showing the sizes of sheets for oil cans. A table of the dimensions of straight and flaring tinware that will cut to advantage. Tables of the weight of sheet iron, copper and zinc per square foot. Tables of tin roofing. A table for converting decimals into common fractions, progressing by thirds of an inch. Above all, show us how to figure the dimensions of straight and flaring dishes. This part should be carefully illustrated and explained by numerous practical examples.

From W. W. VAN F., *Newburgh, Mich.*—I have read with interest the different opinions expressed with reference to the pattern book, and since suggestions are invited, I will offer mine. A table giving the cost of stock for the different prices of tin-



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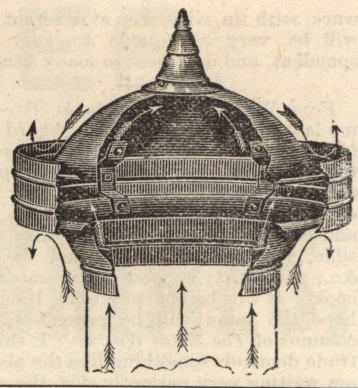

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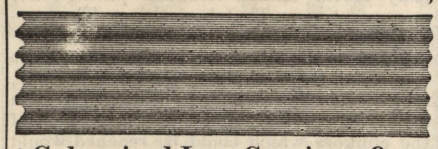

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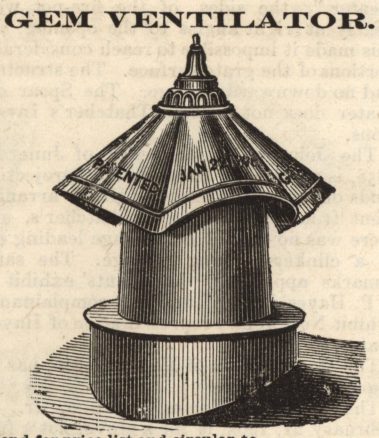

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ware, with tin, wire, &c., at different prices, will be very acceptable to your correspondent, and doubtless to many others.

From W. H. S., *Philadelphia, Pa.*—Since my last communication with regard to the new pattern book, I have carefully read all the letters in *The Metal Worker* upon the same subject. I fully indorse your several correspondents, G. W. K., H. M. C., F. S. and B. K. I hope their suggestions, if possible, will be carried out, and the tables, &c., which they suggest incorporated in the book. If this be not practical, I certainly hope the same will be presented in the columns of *The Metal Worker*. I think the trade demands something like the above. I am waiting very patiently for the appearance of the new book, but I would say to you make haste, as I believe it will fill a ntche in the trade long vacant and empty.

The somewhat general remarks in our editorial columns on the subject of iron, and the report elsewhere printed of the proceedings of the National Association of Stove Manufacturers, render unnecessary any detailed discussion here. Our trade report shows that, while the New York market for domestic pig is not quite so buoyant as it was a few weeks ago, which is to be expected, there is nothing in the situation which can be construed as a sign of weakness. Our advices from other points are to the same effect, and the natural inference is that, when consumers who are now disposed to "hold off" come into the market to supply their imperative needs, prices will stiffen considerably, unless something unexpected should happen in the meantime to change the aspect of affairs.

Scotch Pig Iron.

We have received from more than one correspondent letters asking us to describe the difference in quality between the several brands of Scotch pig iron well known in this market, and to state the various uses for which each grade is especially adapted. This information would be valuable, and we should be very glad to give it; but only those who are experienced in the use of Scotch iron in the foundry are able to do this. The importers and dealers know little or nothing on this subject, and the literature of metallurgy, so far as we know, furnishes no data of value to consumers.

As the bulk of the foreign pig thrown upon the American market at the present time is Scotch, many have been obliged to replenish their stocks from this source, although they have little or no knowledge of the metal they have purchased, and of the manner in which it may be used to best advantage. How far the absence of such knowledge may be regarded as giving rise to numerous complaints of the quality of foreign pig, we are not prepared to state, but it is likely that the uses of Scotch pig are not as fully understood now as they were ten or twenty years ago. It is to be regretted that a large and important industry like the Scotch iron trade has never sought to give consumers a better assurance of the value of its product. The example of a number of prominent smelters of the Rhenish provinces and Westphalia, Germany, who combined to show, by tests and and analyses, that their product was at least equal to Scotch pig for the very purposes for which the latter was chiefly bought, ought to have stimulated the Scotch ironmasters to effort in the same direction. They cannot expect that occasional customers would be accurately informed as to the best method of using the metal purchased, and they should follow the example of many manufacturers engaged in other branches of industry, in giving as full and accurate an account of the properties of their goods as possible under the circumstances. All departments of the iron trade which furnish raw materials will, we believe, in time be forced to give mechanical, chemical and working tests of their product, and it is likely that the manufacturers of pig for foundry purposes will be forced to fall into line before long. A strong effort has been made in this country by a few ironmasters —for instance, the makers of the Salisbury pig—and it is a notable and suggestive fact that those who have led the way in this direction have been the ones whose product was already in the enjoyment of a well-earned and wide reputation for inferior quality. The value of well-planned tests is now generally understood, and it is likely that, as the demand for such information increases, the means of providing reliable and conclusive data will be greatly enlarged and fully developed.

The main features which commend Scotch iron to the founder is that it is very gray and of great fluidity, while its shrinkage is comparatively low. There are a large number of brands of Scotch pig, among which we would mention Coltness, Langloan and Summerlee, of which the two latter are little inferior to the first, which is considered the best brand of Scotch pig. A second class of irons which rate approximately equal to one another are Glengarnock, Gartsherrie, Carnbroe and Shotts, while Monkland and Govan are rather poor for foundry purposes, and are better adapted for forge purposes. Eglinton is rated as fourth class pig. Within certain limits, of course, the quality of these brands necessarily varies, the metal produced during the summer months being harder than that made during the winter. We may add that old and shrewd Scotch founders express a strong preference for old pig; that is, metal which was made many years since. The following analyses, of which the first was made of Coltness No. 1 and the second of Langloan No. 1, may serve to give an idea of the chemical composition of Scotch pig of the better grade:

	Coltness.	Langloan.	Scrap.
Silicon	3.50	2.93	2.50
Phosphorus	0.98	0.75	0.92
Sulphur	0.02	0.04	0.03
Graphite	3.30	3.40	2.82
C. Carbon	0.20	0.46	0.58
Manganese	1.58	1.62	0.72
Copper	0.10	0.07	0 05
Iron	90.24	90.51	92.80

The average composition of Scotch pig has been stated by good authorities to be 2.5 to 4 per cent. of silicon, 3.5 to 4 per cent. of graphite, 1 to 1.5 per cent. of manganese and 0.8 to 1.0 per cent. of phosphorus. Some very interesting experiments were made some time since in Germany with Scotch pig, and from the records of these tests, conducted by the late Herr Wachler, of Gleiwitz, we take the following data: Trial meltings of Coltness and Langloan pig, composed as given above, were melted with scrap from both, which contained the impurities enumerated in the above with 40 per cent. of this scrap. Coltness pig yielded a metal having a tensile strength of 8.40 tons per square inch, while with 50 and 60 per cent. of scrap, the figures were 8.69 and 9.43 tons respectively. Langloan pig was melted with 40, 50 and 60 per cent. of the same scrap and yielded metal having a tensile strength of 8.80, 8.85 and 10.31 tons per square inch respectively, the iron flowing very thin in each case. The higher grades of Scotch pig, which are produced by smelting calcined black band and pure red specular ores with raw coal, all melt easily and flow well, and they possess the valuable property of remaining gray even in thin sections, so that they are easily worked by machine tools. The cheaper grades have frequently an excessive amount of silicon, from 4 to 5 per cent., or their quality is impaired by too high a percentage of phosphorus. Scotch pig is, therefore, largely used in England, on the Continent and in this country, in order to counteract by its presence the injurious effects of other grades of metal. Its high percentage of uncombined or graphitic carbon makes it particularly suitable for mixing with light gray qualities of charcoal iron, or with old foundry scrap or sprews, of which it will carry considerable quantities. Melted by itself, No. 1 Scotch pig has a shrinkage of one part to 135 parts, or about eight-tenths of 1 per cent., which is a comparatively low figure.

Thatcher vs. Spear.

The following is the text of the decision of Judge Blatchford dismissing the complaint of Thatcher against Spear for alleged infringements of the Thatcher patent of 1867:

Circuit Court of the United States for the Southern District of New York.

THE THATCHER HEATING COMPANY
vs.
JAMES SPEAR AND CRAWFORD SPEAR.

BLATCHFORD, J.—This suit is founded on letters patent No. 71,244, granted to John M. Thatcher, November 19, 1867, for an "air-heating furnace." The specification states that the invention is one of "improvements in air-heating furnaces." The eight figures in the drawings are all of them views of different parts of a furnace. The specification says: "My said invention consists of several improvements in hot-air furnaces designed to be set in brickwork inclosed in any suitable manner." The specification then divides the invention into six parts. The first part consists of one particular; the second part of three particulars; the third part of one particular; the fourth part of two particulars; the fifth part of one particular, and the sixth part of one particular. There are as many claims as there are particulars, namely, nine. Only the second and third claims are involved in this suit. They relate to particulars one and two of the second part of the invention. The text of the specification says, in respect to those particulars: "My invention also consists in the combination and arrangement of a passage-way from and through the furnace front to and into the fire-pot, at the bottom thereof, the passage-way being of sufficient width and hight to admit of the introduction of a slicer or poker for the purpose of slicing the fire and removing the clinker from the grate bars forward, the bottom of the passage way being in a line with the top surface of the grate bars, and the top and sides of the passage way being formed by an inclosing plate extending from the fire-pot to the furnace-front, and joining at the sides the ash-pit box, so as to prevent any communication between said passag-eway leading from the furnace part into the fire-pot and the hot air chamber surrounding the fire-pot; and this part of my invention further consists in combining with said inclosed passage from the furnace front to the fire-pot a downward the opening between the furnace-front and fire-pot, leading from said inclosed passage to the ash-pit, whereby clinkers and other matter removed from the fire-pot may fall into the ash-pit." The specification also says: "The drawings illustrate a furnace for brickwork in which my inventions are embodied. The fire-pot *a* is a cylindrical casting such as commonly used for that purpose, and sits upon a box, also of cast-iron, which incloses the ashpit *b* * * * The fire pot is placed at a sufficient distance from the furnace-front *e*, to allow the hot-air chamber inclosed in the inner surrounding walls to extend around the fire-pot, between it and the furnace-front. * * * At the bottom of the fire-pot, in the front part thereof, is a clinker-cleaning aperture *i*, which extends forward to and through the furnace-front, the passage-way being inclosed by the plate *i*, so that it shall not have any communication with the surrounding hot-air chamber *e*. A stopper may be used to close this clinker-cleaning passage, or that part of it which leads into the fire-pot, if desired, or it may be open to supply air to the fuel in the fire-pot. The aperture should be of sufficient width and hight to permit the use of a slicer or a poker, or some other suitable instrument, for the purpose of slicing the fire, cleaning the grate bars from clinker, and removing the clinker, which may be drawn out through this passage into the room in front of the furnace front, if desired, when the downward passage *j* is not used, in which case there should be a plate across the space between the fire-pot and furnace front, on a level with the top of the surface of the grate bars. The downward passage *j*, between the furnace front and grate, is an opening leading from the clinker-cleaning passage down to the ash-pit, for the purpose of allowing the clinker and ashes to fall from the clinker-cleaning opening into the ash-pit." The second and third claims are in these words: "2. The clinker-cleaning passage from and through the furnace front to and into the fire-pot, inclosed by the plate connected with fire-pot, furnace front and ash-pit, so as to prevent communication with the hot-air chamber surrounding the fire-pot, substantially as described. 3. In combination with the clinker-cleaning passage leading therefrom to the ash-pit, substantially as described."

Various prior structures and patents are set up as anticipating the second and third claims on the question of novelty. One is the furnace represented by the defendants' exhibit "Old Philadelphia Heater." It is adduced to defeat the second claim. On the whole evidence, it did not contain a practically useful clinker-cleaning passage nor one operating as Thatcher's does. The passage was so narrow at its inner end in proportion to the diameter of the grate, as to require all the clinkers on the grate surface, which could be reached, to be drawn to such a narrow aperture, and thus a large part of the clinkers which could be reached would be drawn through and carry along with them the live coals remaining in the parts previously cleaned of clinkers. This difficulty is obviated in Thatcher's arrangement, by the relation which the size of the inner end of the passage bears to the size of the grate. Moreover, in the "Old Philadelphia Heater," the sides of the fire-pot were nearly at right angles to the opening, and this made it impossible to reach considerable portions of the grate surface. The structure had no downward passage. The Spear car heater does not contain Thatcher's inventions.

The John P. Hayes patent of June 22, 1858, is adduced. The upwardly projecting studs on the grate prevented Hayes' arrangement from operating like Thatcher's, and there was no downward passage leading out of a clinker-cleaning passage. The same remarks apply to "defendants' exhibit of J. P. Hayes' heater" and to "complainants' exhibit New Jersey representation of Hayes' heater."

The Moore patent of May 22, 1866, has no bearing on the case.

The patent to James Morrison, Jr., of February 21, 1865, is for a stove, not a furnace. The stove has, near its base, an opening from the outside, on a level with the grate, to and into the fire-pot, for the purpose of raking only the clinkers and dropping them into the ash-pit over the edge of a projection from the grate. The clinker-cleaning passage does not extend through a chamber containing hot air, as in Thatcher's arrangement. Nor is the downward passage wholly within the clinker-cleaning passage, as in Thatcher's structure, but, on the contrary, it is wholly outside of the clinker-cleaning passage. The Morrison model, if differing from the description and drawings of the patent, cannot be regarded to effect Thatcher's patent. The Thatcher patent requires that the clinker-cleaning passage shall be inclosed by a plate connected with the fire-pot, furnace front and ash-pit, which shall prevent communication with a hot-air chamber surrounding the fire-pot, and that the downward passage shall be wholly between the furnace front and the grate, and none of it outside of the furnace front. No such arrangement is found in Morrison's structure.

The material question is that of infringement. In the defendants' structure, represented by the plaintiff's exhibits D, E, F, G, H and I, and which are represented also in substance by the defendants' model "Anti-clinker" heater, the anti-clinker arrangement for cleaning the grate is placed wholly below the hot-air chamber, and below the bottom of the fire-pot and within the ash-pit. The clinker-cleaning passage does not go through the hot-air chamber. In the Thatcher arrangement the clinker cleaning passage is above the ash-pit and goes through the hot-air chamber. As the defendants do not have the clinker-cleaning passage of the second claim of the Thatcher patent, they do not have the clinker-cleaning passage of the third claim, and so neither claim is infringed.

Nor do the exhibits K and L and Argus stove infringe either the second or the third claim. They do not have any hot-air chamber surrounding the fire-pot, and so do not infringe the second claim. They do not have the clinker-cleaning passage of the third claim, because they do not have the clinker-cleaning passage of the second claim inclosed by the plate of the second claim, shutting off communication with a hot-air chamber surrounding the fire-pot.

The bill is dismissed, with costs.

B. F. Lee for the plaintiff. E. Cowen for the defendants.

Perry & Co.,

Albany, N. Y., have changed the name of one of their stoves from "Beautiful Queen" to "Quincy." Their reason for this is that after the stove had been placed in the market they learned that the name "Beautiful Queen" was not new, having been used once or twice before. This is a difficulty frequently experienced by manufacturers, which promises to become more serious as time passes. The nomenclature of stoves is becoming quite an interesting study, and at the rate at which we are now going manufacturers may soon be compelled to have recourse to arbitrary combinations of letters. We would suggest that a Welsh dictionary will be found to contain a mine of wealth in this particular line, and that names could be found therein quite as good as many now in use, and altogether unlike any yet employed.

J. C. Henderson,

Troy, N. Y., sends us the catalogue of the "Tubular" and "Lively Times" furnaces, and of his cone and dome hot-air furnaces. Mr. Henderson has given many years to the study of furnace construction, and claims to have reached results as nearly perfect as it is possible to get. He makes fourteen sizes of self-feeding furnaces, which may be used as portable or brick-set, as desired, and nine sizes of surface burners. In the early pages we find a very practical essay on hot-air heating, which contains many valuable suggestions, and which, when opportunity serves, we shall take the liberty of reproducing in our columns.

The Michigan Stove Co.,

Detroit, Mich., send us a very handsome-colored calendar for 1880. The slips are of black with gold figures, and each slip shows one week. The groundwork of the card is a gray, upon which the letters in gold, red and black show to good advantage. A carmine border, with an outer band of ornament in carmine, gold and black, makes the whole very rich in effect. The trade-mark of the company is above the calendar slips, and has a pale blue ground with a carmine border. An ornamental head band in black and gold finishes the top of the card. Taken altogether, it is a very striking bit of color work, and is very effective upon the wall. Works of this sort are pleasing indications of an improvement in the matter of taste, and that people are beginning to appreciate that which is really beautiful.

W. C. Davis & Co.,

Cincinnati, Ohio, send us their new price list of the "Favorite" stoves. The cover is printed from steel plates, upon pale tinted board, after the well-known style introduced by John A. Lowell & Co., of Boston. One of the pages represents evening and the other morning. The letter-press of the list, which is very fine, is in two colors upon the finest of calendered paper. The list includes not only the "Favorite" stoves in all their various styles and sizes, but all the goods manufactured by the firm in the way of hollow-ware, trimmings, and tin and copper ware

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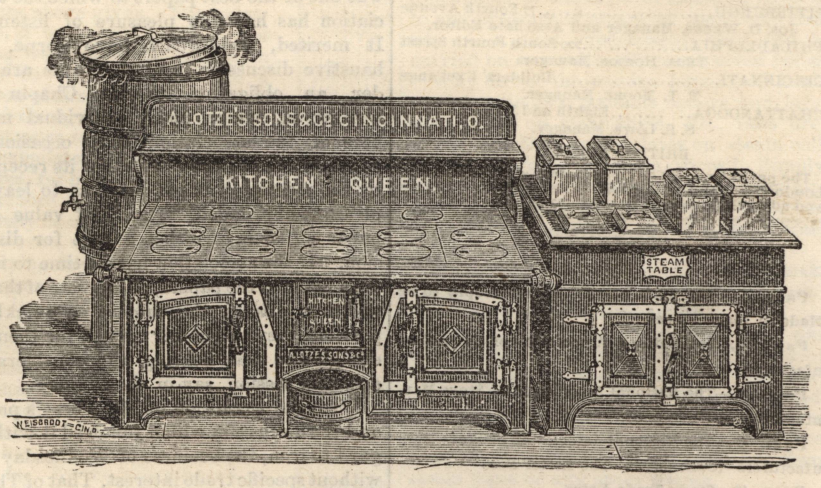

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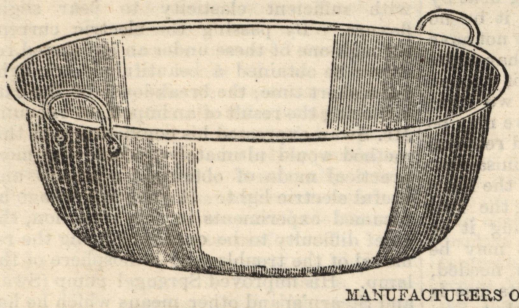
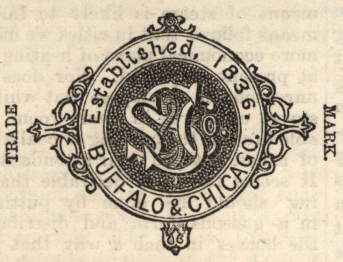


TRADE  MARK.

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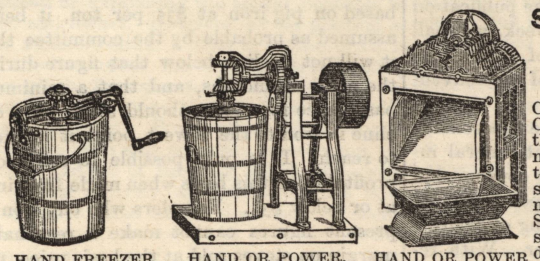

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New York, Saturday, February 7, 1880.

DAVID WILLIAMS - Publisher and Proprietor
JAMES C. BAYLES Editor.
JOHN S. KING - Business Manager.

The Metal Worker is published every Saturday Morning at No. 83 Reade Street, New York.

RATES OF SUBSCRIPTION,

INCLUDING POSTAGE.

United States, British America and Sandwich Islands, $1·20

All Other Countries, $2=8/=10 francs=8 marks=½ roubles (coin)=10 lire=10 pesetos.

REMITTANCES

should be made by draft, payable to the order of David Williams, on any banking house in the United States or Europe; or when draft cannot be obtained in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS

in any part of the world may obtain *The Metal Worker* through the American News Company, New York, U. S. A.; the Wilmer & Rogers News Company, New York, U. S. A., and London, England; or the San Francisco News Co., San Francisco, California, U. S. A.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.

PITTSBURGH.....77 Fourth Avenue
JOS. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA..... ... ...220 South Fourth Street
THOS. HOBSON, Manager.
CINCINNATI..... .....Builders' Exchange
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The National Association of Stove Manufacturers.

Elsewhere in this issue we publish a very full report of the first day's session of the National Association of Stove Manufacturers, at the Fifth Avenue Hotel in this city. The session of Thursday was altogether the more important of the two, and while we shall be compelled to defer the publication of its proceedings until next week, we shall anticipate its features of chief interest in our comments on the action of the convention with regard to prices.

As our readers will see, the proceedings of the first day are of somewhat general interest and the time was largely consumed in the reading of papers, the appointment of committees and the dispatching of routine business of one kind or another. With regard to papers we have a word to say, which, we hope, will give no offense to any one, but which, we think, should be said plainly.

The Association as an organized body does not treat with becoming consideration and respect the papers read before it. Every year it expresses a desire to have papers read at its meetings by appointing a committee to solicit such contributions to its proceedings. To prepare these papers, often secured by earnest personal appeal, imposes on the writers no little trouble. They represent thought, study and work, and are read without expectation of other compensation than the satisfaction which the writers feel at having contributed something to the fund of general information or suggested new and useful ideas. Now, how are these papers received? Usually they are patiently listened to, though not unfrequently the speaker is more or less interrupted by gentlemen leaving the room. When finished there is rarely any discussion, but as soon as a formal vote of thanks is passed somebody jumps up and says that they have listened to a very pleasant paper, but now he "should like to hear something practical"—Mr. Smith's views of the future of pig iron, or Mr. Jones's views of the state of trade in the West. No disrespect is meant to those who read papers, but in nearly every instance the impatience manifested to change the subject, following a few words of faint commendation, leave an unpleasant impression and make those who read papers wish they hadn't, and vow they never will again. If the papers relate to art or to physical science in its relations to stove making, something is pretty sure to be said about theory being all very well, but not counting for much in practice, or to the effect that as other and more important subjects are pressing, it is not worth while to waste time in discussion. Now this is wrong, however regarded. If the association do not want papers, or if they want only papers which talk about the cost and prices of stoves, they should either abolish the committee or give them specific instructions. If a paper is prepared by formal and official request, and presented at a meeting with the sanction of approval by the chair, it is entitled to a pleasanter reception than is commonly accorded it. A striking illustration of this was furnished in the way Mr. Chapin's delightful paper on the principles of art in stove construction was received. As a contribution to the literature of the subject of which it treated, it was one of the best papers to which the association has had the pleasure of listening. It merited, and would have borne, exhaustive discussion, and the trade are under an obligation to Mr. Chapin for writing it, which many individual members of the association took occasion to express after adjournment; but its reception by the meeting was not such as to leave a pleasant impression. The chief value of a paper is that it furnishes a text for discussion. If the association has no time to more than listen to the papers, pass a vote of thanks and then change the subject as quickly as possible, they had better not ask for them, or else give to their hearing and consideration a special session, say in the evening.

With the exception of Mr. Perry's paper, and the discussion which followed it with regard to iron, the business of Wednesday was without specific trade interest. That of Thursday, however, was important to all classes of our readers. On recommendation of the committee appointed to prepare an order of business, it was resolved to adopt 6½ cents per pound of castings, as the minimum price of the commonest grade of cook stoves and cast-iron heating stoves, to which shall be added the cost of mounting and trimming, including rods, bolts, nuts, grinding and polishing, brick, reservoirs, tin, nickel ornaments and all other materials, plus a reasonable profit thereon. In other words, the basis price for the next six months is 6½ cents per pound of iron castings, and the cost of the other materials used in mounting and trimming are to be added to the selling price. From this basis the figures rise by a sliding scale to 9 cents for the finer classes of goods, with a uniform charge of 8 cents for repairs, and hollow-ware at discount 35 per cent. from list. These figures are based on pig iron at $35 per ton, it being assumed as probable by the committee that it will not decline below that figure during the next six months, and that a minimum basis price for stoves should allow for a decline in iron to the lowest point it is likely to reach. It is only possible to sell goods profitably on this basis when made from iron at or below $35. Founders who buy iron at present figures cannot make a reasonable margin on stoves sold at the basis price, unless the extras are charged out of proportion to their cost. Should iron be maintained at its present line, or experience a further advance, the prices of stoves will doubtless be advanced in proportion; should it decline below $35, the conditions of competition render it quite certain that the dealers will get the benefit of it.

The tone of the discussion on Wednesday and Thursday shows how difficult it is for one whose views are not influenced by his immediate pecuniary interests, to form opinions in which he can feel confidence as to the future course of the iron market. One who listened to the debate could tell pretty accurately how much iron a manufacturer had in yard or contracted for, by the views he expressed concerning the probable course of prices during the next few months. Those who had most iron were most confident; those who had little or none failed to see in the condition of business any warrant for supposing that the present range of values could be maintained. One manufacturer stated that he had bought iron up to $38 no speculation, and that he had none to sell under $45; moreover, that he would rather hold than sell the goods he has on hand and is making, and that he had given instructions to send out no travelers and to sell as few goods as possible. Those who were well supplied with iron considered this a wise policy; those who were short no doubt considered it midsummer madness, altogether unseasonable in February. Mr. Filley probably expressed the average opinion in his plain, practical way, when he confessed that he did not consider his opinion worth anything, as he had been mistaken all along and did not know what to expect for the future. But allowing for all reasonable differences of intelligent opinion on this subject, the fact remains that pig iron is now crowding $45, that it is strong for the moment, and that the manufacturer who expects to buy iron very soon at a much lower figure than it now commands, and shapes his business policy on this expectation, takes a risk not warranted by a due regard for prudence. The immediate future is, to say the least, very uncertain, and the only wise policy for manufacturers to adopt at the moment is to act on the assumption that they will have to replace the iron they are now melting at the price it now commands in the market.

In the Stove Trade Notes this week we give the decision of Judge Blatchford, dismissing, with costs, the complaint of the Thatcher Heating Company against James Spear and Crawford Spear, based on certain alleged infringements of Thatcher's patent No. 71,244, dated November 19, 1867. As this is a matter of general interest, we obtained from the clerk of Judge Blatchford's court permission to copy the record in advance of its publication.

Heating Cities—The Co-operative Plan.

The Toronto *Daily Globe* for Jan. 7 devotes nearly two columns to a letter from London, Canada, on the subject of steam heating for that city. Considerable progress has been made in supplying the city with steam upon the Holly system. It seems that several lines of mains have already been laid, and a number of houses, stores, banks and churches have been supplied with steam for heating purposes. As usual, the prospect for the general introduction of steam in that city is painted in the most rosy colors. It seems from this report that gas tar, at an expense of about 90 cents per barrel, is available for fuel under the boilers. Altogether the system is under very favorable conditions.

It is unfortunate for Mr. Holly that he did not succeed in introducing his system of heating years ago. While he can doubtless make a great saving over the cost of heating by small coal fires, his system is by no means free from the imputation of being both costly and wasteful. In the generation of the steam we find a very considerable loss, which is increased by the condensation during distribution. Though this may be small upon single lines of pipes, it will be a serious matter when large areas are to be heated. The apparatus required within the house is another serious objection not easily met.

Because this plan of distributing heat by means of steam is likely to fail, it by no means follows that in cities we may not have more economical plans of heating than those at present employed. Nor does it appear unreasonable to suppose that while we have stoves and fires in every room, we may be able to avoid the burning of coal and removal of ashes, with all their attendant nuisances. It seems far more desirable that the heating should be done by putting the fuel in a gaseous form and distributing it to the houses in such a way that it may be burned when and where it is needed, and cut off when the occasion for its use is past. It has been demonstrated that carbon in any form can be readily and cheaply transformed into a gas by a not very expensive plant, which can be distributed in the same manner as illuminating gas. Various processes for producing such a gas are successfully at work both in this country and abroad, and it only remains to introduce such a gas into our towns to enable us to heat our houses, cook, and perform any operation needing heat at a minimum expense. The figures at which a non-illuminating gas of this character can be made and delivered to the gas holder ready for distribution are so low as to be almost incredible to those not familiar with the subject. With such a fuel easily distributed, without any great loss, easily measured, and requiring only a minimum amount of apparatus in each house, heating and cooking can be done at an almost nominal cost as compared with the system now in use. Steam heating will be found costly and cumbersome in comparison. The advantages of using gas for heating and cooking purposes have long been recognized, but the price of ordinary illuminating gas has been so high that in this country people have given almost no attention to the subject. In Great Britain, where the highest price for gas is rarely above $1 per thousand cubic feet, gas is largely used both for heating and cooking. With the possibility of a gas which shall be low in price, to be used for heating only, an entirely new field is opened.

It is difficult at the present time to see just what the result will be, or to predict the changes in the domestic economy of cities which will be effected by the introduction of a cheap heating gas. Those who are familiar with the matter say that the price to consumers may be made much below 50 cents, per thousand feet, and still have a very handsome profit. Even with gas at 50 cents, the use of coal for heating purposes on a large scale would not be good economy, and it might be found that under steam boilers there would be a decided saving. In the item of fireman's wages there would be a very great saving, for the engineer could take charge of the boilers, as there would be no coal to handle nor ashes to hoist out.

Edison Light Patents.—The Edison Electric Light Company, it is said, is not to have a patent for the carbonized paper horse-shoe lamp without a contest. The parties contesting Edison's claim for a patent on his new lamp are large capitalists, and are represented in Washington by attorneys whose specialty is electric light patent cases. It is evident that it will be a long time before this contest is settled, and if Edison does get a patent for his lamp it will not be until after years of fighting. The following are the claims made before the Commissioners of Patents on behalf of the Sawyer-Man lamp in the proceedings for an interference: 1. Incandescing arcs for electric lights made of carbon substantially as hereinbefore set forth. 2. Incandescing arcs of carbon in combination with the circuit of an electric light. 3. The combination substantially as hereinbefore set forth of the circuit of an electric light, an incandescing arc of carbonized paper included in the circuit and a close transparent chamber in which the arc is inclosed. 4. An incandescing arc made of carbonized fibrous or textile material.

"Eckel Gutter Company" is the style of a new firm recently formed at Richmond, Ind., for the purpose of manufacturing the Eckel Hanging Gutters for roofs. They have recently received their first machine for making 56-inch tin or galvanized iron gutters. A man and a boy will cut and break 6000 feet per day at a safe estimate. The gutters when they come from the machine are ready to pack for shipment. We saw 224 feet passed through the machine in 14 minutes. These goods are safely packed in bundles of convenient size for shipment. Since the introduction of the long gutters in the Western market, the trade has largely increased, roofers preferring to purchase the gutters ready made rather than to make them from the ordinary short lengths of tin. The stock for these long gutters is imported direct from England, there being no stock kept in store by any American firm that we know of.

Mr. Barnard S. Proctor, of Newcastle, England, in a letter to *Engineering*, claims for Mr. J. S. Swan the priority of invention of the use of paper carbons for electric lamps. He says that many years since Mr. Swan prepared carbon from paper, having ignited it in a potter's kiln. The carbons he produced at that time were gray, with something of a plumbago luster, sonorous and with sufficient elasticity to bear slight flexure. By passing the electric current through one of these under an exhausted receiver he obtained a beautiful electric light for a short time, the breakdown of the carbon being the result of an imperfect vacuum. Mr. Swan expressed his conviction that this method would ultimately become the most practical mode of obtaining a steady and useful electric light. A year or two ago he resumed experiments in this direction, the chief difficulty to be overcome being the removal of the troublesome atmosphere of the lamp. His improved Sprengel pump (Swan and Stearn's) and other means which he has taken to improve the vacuum, now promise to yield a light of satisfactory permanence as well as of great steadiness and beauty.

A Citizens' Water Works Company, composed of leading capitalists of Maysville, Ky., has just been organized, who propose to build the works precisely according to the Louisville bid for $15,000 less money. If the city desires to become the owner, she is permitted to pay the above amount in such sums, in such manner and at such times as she pleases.

It costs St. Louis, according to a late report published in the *Globe-Democrat* of January 11, $96,000 per year to pump the water that is simply wasted in that city.

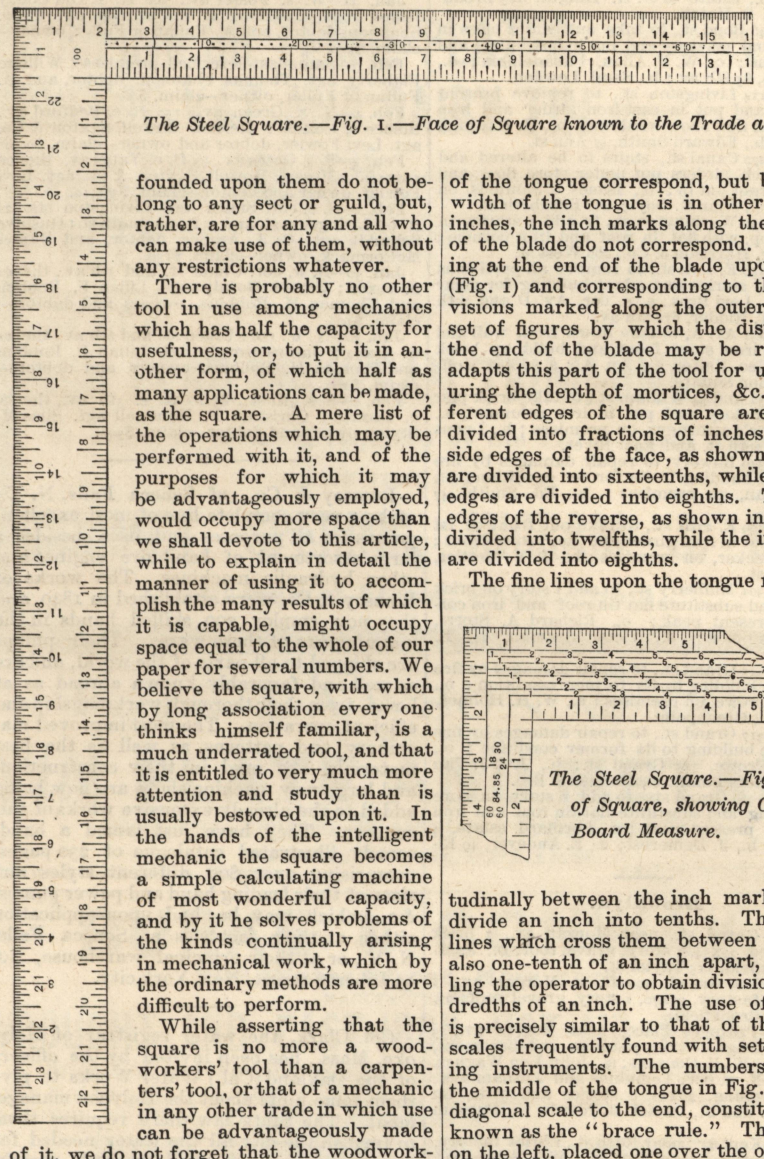
Can a hen with a clipped wing be said to have a defective flew?

The original base-burner—Your mother's slipper.

The Steel Square.

In all that has been written for *The Metal Worker* upon the subject of pattern cutting, and in all that has been published of letters from our readers about shop rules, little or no attention has been given to the steel square, the usefulness of which in a general way must be unquestioned. Just why every one has omitted a statement of the uses to which this tool may be put it is difficult to determine. It may be that tinners generally are disposed to consider it a wood-worker's tool, and fail to see any fitness in their use of it. But if it is only a wood-worker's tool, there is still good reason why tinners and mechanics of other trades among our readers should know something about it. A saw is certainly a wood-worker's tool, and the hatchet was not devised as an instrument for a metal worker's use, but both saw and hatchet are found very useful things to have and to be able to use about every shop. There is enough rough wood-work to be done and enough repairing required in the regular course of business to make a certain degree of familiarity with the use of these wood-working tools quite convenient. The same is true, although in a little different sense, of the steel square, considering it for the moment as exclusively a wood-working tool. There is many an odd job—a shelf to put up, a bench to build, a partition to construct or a framework to make—which it is very well to do without the expense and bother of sending for a carpenter. Familiarity with hatchet, saw, plane and square in such cases is very desirable.

But the steel square is not exclusively a wood-worker's tool. Accurately described, it is a mathematical instrument of very extensive application, and is available for use in the problems of pattern cutting, as well as in those of framing and construction. The tinner and metal worker have as clear a title to its employment as the carpenter, and because some one saw a carpenter employing a square before he noticed a tinner using it, affords no just cause of accusing the tinner of appropriating a wood-worker's tool. Mathematical principles and the tools



The Steel Square.—Fig. 1.—Face of Square known to the Trade as No. 100.

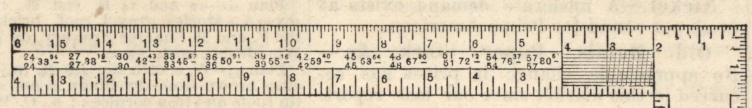
founded upon them do not belong to any sect or guild, but, rather, are for any and all who can make use of them, without any restrictions whatever.

There is probably no other tool in use among mechanics which has half the capacity for usefulness, or, to put it in another form, of which half as many applications can be made, as the square. A mere list of the operations which may be performed with it, and of the purposes for which it may be advantageously employed, would occupy more space than we shall devote to this article, while to explain in detail the manner of using it to accomplish the many results of which it is capable, might occupy space equal to the whole of our paper for several numbers. We believe the square, with which by long association every one thinks himself familiar, is a much underrated tool, and that it is entitled to very much more attention and study than is usually bestowed upon it. In the hands of the intelligent mechanic the square becomes a simple calculating machine of most wonderful capacity, and by it he solves problems of the kinds continually arising in mechanical work, which by the ordinary methods are more difficult to perform.

While asserting that the square is no more a wood-workers' tool than a carpenters' tool, or that of a mechanic in any other trade in which use can be advantageously made of it, we do not forget that the wood-workers use it much more than the tinners, nor that the squares made and sold are almost exclusively of the kind known as carpenters' squares. There are so few requirements in the tool specially pertaining to the tinners' use of it, that a square calculated exclusively for him is hardly demanded. Or we may state it in other words, thus: There being no objection to the marks upon the square, put there especially for the carpenter, the tinner finds all his requirements met when he obtains a carpenters' square. Tinners, then, are using carpenter's squares because there are no special marks and scales required to be put upon the tool for their use, and because the scales and marks employed by the carpenters do not incommode them, not because they have learned to employ a tool in one line of mechanical employment which really belongs to another.

Since the squares which tinners are using are of the kind usually employed by carpenters, an explanation of the marks and scales to be found upon them cannot fail to be of interest. Accordingly at this time we will present a general description of the tool, from a carpenter's standpoint, reserving for another opportunity a consideration of some of the problems in the solution of which it may be advantageously employed.

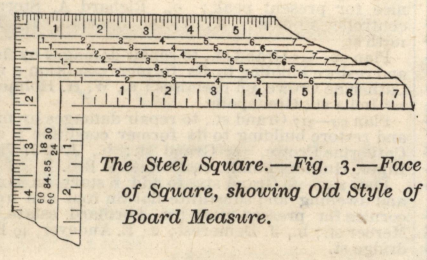
One of the first things to consider in the study of the square is the marks and scales upon it. The only matter demanding prior attention is the names of the parts of the square itself. The long arm of the square is called the blade. The short arm is called the tongue. The junction between the blade and tongue is called the heel. The blade of the square is 24 inches long, and the tongue from 14 to 18 inches. The blade in good squares is 2 inches, while the tongue is 1½ inches wide. With inferior tools the tongue is sometimes narrower.



The Steel Square.—Fig. 2.—Reverse of Square known to the Trade as No. 100.

In the accompanying engravings Figs. 1 and 2 show a steel square of the best grade, being known in the hardware trade as No. 100. The cuts show the tool and all its divisions at one-fourth full size. The first marks which attract our attention, and which are also the best known, are the divisions into inches and fractions of inches. The heel of the square is the point from which it is most convenient to measure, both along the blade and also on the tongue, and hence in numbering the inches the figures commence at the heel, running toward the end of the blade and tongue respectively. The inch marks along the inside edges of the square commence numbering likewise with the interior angle. Since the width of the blade is in even inches, the inch marks upon the two edges of the tongue correspond, but because the width of the tongue is in other than even inches, the inch marks along the two edges of the blade do not correspond. Commencing at the end of the blade upon the face (Fig. 1) and corresponding to the inch divisions marked along the outer edge, is a set of figures by which the distance from the end of the blade may be read, which adapts this part of the tool for use in measuring the depth of mortices, &c. The different edges of the square are variously divided into fractions of inches. The outside edges of the face, as shown in Fig. 1, are divided into sixteenths, while the inside edges are divided into eighths. The outside edges of the reverse, as shown in Fig. 2, are divided into twelfths, while the inside edges are divided into eighths.

The fine lines upon the tongue ruled longitudinally between the inch marks 2 and 4, divide an inch into tenths. The diagonal lines which cross them between 2 and 3 are also one-tenth of an inch apart, thus enabling the operator to obtain divisions of hundredths of an inch. The use of this scale is precisely similar to that of the diagonal scales frequently found with sets of drawing instruments. The numbers occupying the middle of the tongue in Fig. 2 from the diagonal scale to the end, constitute what is known as the "brace rule." The numbers on the left, placed one over the other, represent the run, or, in other words, the two sides of a right-angled triangle, while the numbers to the left represent, in inches and (decimal) fractions of an inch, the length of the third side or hypothenuse. Or, to explain it in another way, the equal numbers placed one above the other may be considered as representing the sides of a square, and the third number to the right the length of the diagonal of that square. Thus the exact length of a brace between shoulders having a run of 57 inches on a post, and a run of the same on a beam, is 80.61 inches. The brace rule varies somewhat in the matter of the runs expressed in different squares. Some squares give a few brace lengths of which the runs upon the post and beam are not equal. For example, $\frac{18}{24}$ $\frac{30}{}$, will be found among others.



The Steel Square.—Fig. 3.—Face of Square, showing Old Style of Board Measure.

The parallel rows of figures along the blade in Fig. 2 constitute what is called board measure. The manner of using it is as follows: Under 12 of the inch marks along the outer edge of the blade will be found the figures 8, 9, 10, 11, 12, 13, 14 and 15, which represent the length of the board or plank to be measured. The contents in feet and inches will be found under the several inch marks along the outer edge of the blade, corresponding to the width of the piece being measured. We can make this plainer by a simple illustration. Suppose we desire to ascertain the contents of a board 14 feet long and 10 inches wide. Find 14 under 12 of the inch marks along the edge. Follow the space in which it is placed back to the figures under 10 of the inch marks, where will be seen 11.8, which is read 11 feet and 8 inches. In like manner if the board is 16 inches wide, the result (under 16 of the inch marks) is found to be 18.8, or 18 feet and 8 inches. In the same way the measure of boards of any width from 2 inches up to 24 inches, and of either of the lengths above enumerated, may be quickly and accurately determined. By combining figures, lengths may be calculated which are in excess of those above given. For example, if we have a board 20 feet long we double the answer in the 10 feet row, and for a piece of timber 25 feet long we add the figures in the 12 and 13 feet rows together. This rule is calculated, as its name indicates, for board measure or for surfaces 1 inch in thickness. It may be advantageously used, however, upon timber by multiplying the result of the face measure of one side of a piece by its depth in inches. To illustrate: Suppose it be required to measure a piece of timber 25 feet long, 10 x 14 inches in size. For the length we will take 12 and 13 feet. For the width we will take 10 inches, and multiply the result by 14. By the rule a board 12 feet long and 10 inches wide contains 10 feet, and one 13 feet long and 10 inches wide, 10 feet 10 inches. Therefore, a board 25 feet long and 10 inches wide must contain 20 feet and 10 inches. In the timber above described, however, we have what is equivalent to 14 such boards, and therefore we multiply this result by 14, which gives 291 feet and 8 inches, the board measure.

On some squares the board rule is arranged in the shape indicated by Fig. 3 of the accompanying engravings that is, the numbers representing contents instead of being feet and inches are even feet, and instead of being placed in regular rows under the several inch marks, are arranged diagonally, as in the cut. The use of this form of the rule is the same as that of the one above described, save that all the answers give the nearest approximate even number of feet, instead of expressing the actual contents in feet and inches. However, by the position of the numbers either a little to the left or right of the line under the inch mark indicating the width, the operator is supposed to determine in his mind the fractional part of a foot contained. From all the information we have been able to obtain concerning the origin and use of this rule, which at present is almost entirely superseded by the later and better form above described, it seems that it came into existence at a time when fractional parts of a foot in measuring lumber were disregarded, and when things generally were conducted upon a broader and more liberal basis than at present. It does not answer at the present day to calculate a board at 18 feet when in reality it contains 18 feet 8 inches.

Along the center of the tongue upon the face, as shown in Fig. 1, will be noticed a number of dots, and a row of figures numbering them by tens. This is known as the "octagonal scale," the use of which is as follows: Suppose it is required to reduce a square timber, say, for example, 12 x 12 inches, to octagon shape. First draw a center line along each face, which, of course, will be 6 inches from the several edges. With the compasses, take twelve of the divisions in the octagon scale, and set off this space on the faces of the timber, measuring each way from the center lines. The points thus obtained will be correct for the gauge lines. The rule always to be observed is as follows: Set off from each side of the center line upon each face as many spaces by the octagon scale as the timber is inches square. For timbers larger in size than the number of divisions in the scale, the measurements by it may be doubled or trebled, as the case may be.

Now, it will not surprise us at all if our readers (the tinners and metal workers) find themselves, after perusing the above description of the square, better informed concerning the marks and scales upon it than the carpenters among their acquaintances. On the other hand, the carpenters are able to teach them many a trick in the use of the square applicable to the tinners' requirements, which upon demonstration will be apt to open somebody's eyes in astonishment. So perhaps after all, things are about even on the first count. It is a good subject for study, and much will be gained by a comparison of notes, both among mechanics of the same trade and between mechanics working at different trades.

Fire from Steam Pipes.

The following correspondence appeared in a recent number of one of our scientific periodicals:

What tests and experiments have been made regarding the liability of woodwork being fired from contact with steam coils? I wish to learn if such experiments go to show that liabilities from fire are greater where wood is in contact with steam coils.

D. E. Smith.

Community, Oneida, N. Y.

In answer to D. E. Smith, Oneida Community, N. Y., I will say that fourteen years' observation has led me to the conclusion that it is utterly impossible to fire wood, or even touchpaper or tinder, with steam in pipes up to any pressure of steam at maximum density—*i. e.*, not superheated—that can be carried on any ordinarily constructed boiler.

Why do not the wooden lagging of steam engine cylinders, portable boilers and large steam pipes on steamships, &c., take fire? or the dust that accumulates on steam coils in woodworking machine shops? Simply, because the temperature of the steam pipe is not sufficiently high, and that the lowest temperature capable of doing so is between 500 and 700° F.

But some will hint at conditions and make use of the words "concentration of heat" and "spontaneous combustion."

Heat of this description cannot be concentrated, and is not capable of making anything hotter than itself, and spontaneous combustion has no place in our consideration, other than, if we are dealing with substances that are likely to fire spontaneously, heat will assist them, whether from steam pipes or any other source.

No one imagines they can light a stick against a boiling kettle (temperature 212 degrees), but many will say: How would it it be if I had 100 or 200 pounds of steam, it would be so much hotter then? It will be hotter. The following table shows the increase in temperature for each 100 pounds in pressure (above atmosphere) up to 400 pounds. Let them judge for themselves:

Pressure. Lb.	Temp. Fah. degrees.	Increase temp. degrees.
1	214	.....
100	338	124 1st 100
200	388	50 2d 100
300	422	34 3d 100
400	448	26 4th 100

Respectfully,

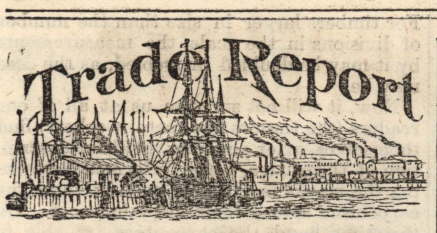
Wm. J. Baldwin, Heating Engineer.

Elmira, N. Y., January 1, 1880.

Note.—We do not think this a fair and candid statement of the case. Mr. Baldwin asks the question why does not the lagging of steam pipes, boilers and steam cylinders take fire and burn? We reply that when the lagging is really in contact with the boiler it does often take fire, and upon cylinders and steam pipes it is usually sufficiently cool upon the outside, so that the temperature cannot rise much, if any, above 190 or 200 degrees. Wood, when exposed to a temperature of from 212 to 300 degrees, for a long time in a space where there is no circulation of air, appears to undergo a change and to become partially carbonized. What the result of this is when long continued is not known. There is every reason to believe that the temperature at which the wood takes fire is lowered. Mr. Smith evidently contemplated, in asking the question, the whole subject of fires in connection with steam pipes and wooden partitions. There is danger in heating wood up to a temperatue of from 200 to 300 degrees, if for no other reason than that we have brought it so much nearer the point at which it takes fire.

As we have said before in the columns of *The Metal Worker*, experiments upon this subject are greatly needed. One difficulty to be met with in making them is the length of time required to complete them in anything like a satisfactory manner.

It is understood that a further reorganization of the Indianapolis Water Works Company will be made shortly, involving no change of management, however. It is now operated by the second mortgage bondholders, who will cause a sale to be made under the first mortgage and buy the property. The first mortgage is for $300,000, the second for $500,000.



Office of THE METAL WORKER,
SATURDAY MORNING, February 7, 1880.

Antimony.—Since we last reported nothing of special interest has occured. The price of this metal is sustained at 23¢ for the "Cookson," and 20¢ for the "Hallet" brand.

Coal.—The storm of Monday has had a perceptible influence upon the trade in and about the city of New York. Although it has not been brisk, there has been a little, and buyers are beginning to ask about Coal and get quotations. This has greatly encouraged dealers, and there is a very much more hopeful feeling in the trade this week than last. Those who are holding, or attempting to hold, the circular rates are not doing any business. Those who were willing to make large concessions and to take what they could get, have managed to work off a considerable amount. It is said that the quantity of Coal coming forward at present is somewhat less than it has been. The stocks, however, are still large, and are, from all reports that we can hear, increasing. The larger or manufacturing sizes are in good demand, and the line trade to furnaces is very brisk. The quotations and the circulars are so far apart that it is only necessary to say that there is a difference of rather more than a dollar between them.

The soft, free-burning Coals are from $2.75 to $2.80 for Broken, Egg and Chestnut, and $3 for Stove. The harder Coals command proportionate prices, while the manufacturing sizes of Lehigh hold at circular rates. The large companies are not selling Coal at the present time. They show considerable concert of action, possibly because they do not wish to begin a war quite so early in the season.

Copper.—The market for Copper has been quiet this week, after the excitement of the last. Sales have been made to the extent of 400,000 pounds Lake Superior at prices from 25¢ down to 24½¢, cash. Rumors are current of yet lower prices, but could not be traced by us. The present quotation is 24½¢, cash, and 25¢ for future delivery; few offerings are made, the bulk of the stock on hand having been sold for future delivery. Baltimore is worth about as much. There has been no change in the manufactures of Copper here since our last report. We quote: Braziers' Copper, 34¢; Bolts, 34¢; Circles, 37¢, and Sheathing Copper, 32¢.

Hardware.—The condition of the market is much the same as at our last writing. The demand continues to be remarkably active for this time of the year, and prices are firm, with a decided tendency toward a higher range of values in many lines of goods. During the week advances in prices have have been made for Cast Butts, Augers and Bits, Axes and Edge Tools, Wrenches and Brass Butts.

The Stamped Ware Manufacturers' Association of the United States, at a recent meeting, adopted the following revised discounts, to apply to their list of January, 1880:

	Dis. per cent.
Common Stamped Ware	15
Deep Stamped Ware	25

The manufacturers of Iron Wire have again advanced prices. The revised discounts will be found under the heading of New York Wholesale Prices, on another page.

Iron.—The tone of the Iron market is not as buoyant as we have noticed it of late, although, as regards the domestic article, there is nothing in the present condition of affairs that could be construed as a sign of weakness, so far as prices are concerned. The amount of business reported during the week is light, and we do not hear of much inquiry. On the other hand, manufacturers are so well supplied with orders that there is no pressure to sell. We quote the market firm at the following figures: Foundry No. 1, $40 @ $41; Foundry No. 2, $38 @ $39; Gray Forge, $37 @ $38. Sales are reported of 200 tons Coltness, to arrive, at our quotations; 100 tons Eglinton at $33; 100 tons Glengarnock at $35, and 125 tons Middlesboro Iron at $32.50. The cable announces a declining market on the other side, and in consequence the tone here is weaker than at our last writing, and some brands are offered at about $1 per ton under the quotations of last week. We quote Eglinton, $32 @ $33; Coltness, $35; Glengarnock, $34 @ $35; Gartsherrie, $33 @ $34. There has been considerable business in Wrought Scrap this week, sales being reported of 1200 tons, in lots, at from $42 @ $45. We also know of a sale of 1000 tons, to go West, at $43, and a rumor is current of a select lot being sold at $46, but we are unable to trace it. We continue our quotation—$43 @ $45 for No. 1 Wrought, from yard. The arrivals during the week were trifling. The demand for Bar and Sheet from store is active, and the advanced price for Bars noticed in our last issue is, we are informed, strictly adhered to by the city trade. Foreign Iron continues to arrive freely.

Lead.—Early in the week some 200 to 300 tons Common Domestic sold at 6¢; since then only small lots have changed hands at the same figure. Small transactions have also taken place in Refined Lead at 6¼¢. Manufacturers' prices are as follows: Bar, 7½¢; Pipe, 7¾¢; Sheet, 8½¢; Tin-lined Pipe, 15¢, all less 10 % to the trade. No. 1 Solder, 13¢.

Nails.—The demand for Nails is generally reported good for this season, and stocks continue light, with assortments in many instances badly broken. The tone of the market is decidedly firm, and holders show no disposition to sell for future delivery at current rates. We quote 10d. to 60d., $5.15 @ $5.25, net, according to quantity.

Nickel.—A moderate demand exists at $1.40 per pound for Prime American.

Old Metals, Paper Stock, &c.—No appreciable change in prices has occurred in this market since our last report. Old Metals continue in good demand, and the inquiry for Rag and Paper Stock is even better than it was last week.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	per lb.	$0.19	@	.20
Copper Bottoms	"	.15½	@	.16½
Yellow Metal	℔ lb	.10	@	.11
Brass, heavy	"	.12	@	.13
Brass, light	"	.08½	@	.09½
Composition, heavy	"	.15	@	.16
Lead, heavy	"	.04¼	@	.04¾
Tea Lead	"	.04	@	.04½
Zinc	"	.03½	@	.04
Pewter, No. 1	"	.12	@	.13
Pewter, No. 2	"	.07	@	.08
Wrought Iron	per ton	32.50	@	35.00
Light do	"	20.00	@	22.50
Stove Plate	"	15.00	@	17.00
Machinery do	"	20.00	@	22.50
Grate Bars	"	7.50	@	10.00

The prices current for Rags, &c., are as follows:

Canvas, Linen	per lb.	4½c.	@	c.
White Cotton, New	"	4½c.	@	....
" No. 2	"	2½c.	@	3 c.
White, No. 1	"	5½c.	@	.....
No. 2	"	3 c.	@	3½c.
Seconds	℔ lb.	2 c.	@	2¼c.
Soft, Woolen	"	16 c.	@	17 c.
Mixed Rags	"	2 c.	@	3 c.
Gunny bagging	"	4 c.	@	....
Jute butts	"	2¼c.	@	....
Kentucky bagging	"	2 c.	@	3 c.
Book Stock	℔ lb.	3 c.	@	....
Newspapers	"	2 c.	@	....
Waste Paper and Scraps	"	1 c.	@	....
Kentucky Bale Rope	"	4 c.	@	....

Spelter and Zinc.—A fair amount of inquiry prevails for Common Domestic Spelter at 6½¢, and at 6¾¢ for Silesian. *Sheet Zinc* is steady at 8¼¢ @ 9¢.

Tin—Our market has ruled rather quiet since our last report. We quote Straits, 26¢; English, 25¢, and Banca, 28¢. The demand for Tin Plates is fair and quotations are unchanged, as follows: I. C. Charcoal, $10 @ $10.50; I. C. Coke, $9.25; Charcoal Terne, $9.25 @ $9.50; and Coke Terne, $8.75.

PROJECTED BUILDINGS.

New York.

NOTE.—In these lists "o." stands for owner, "b." for builder, "a." for architect, and "c." for carpenter.

Plan 71—Lexington av., n. e. cor. 103d st., 1 brown-stone flat and store, 25x62, 4 stories, tin roof and iron cornice; o., Christie & Walker; a., John C. Burne; cost, $14,000.

Plan 72—Lexington av., s. e. cor. 104th st., 1 brown-stone flat and store, 25x62, 4 stories, tin roof and iron cornice; o., Christie & Walker; a., J. C. Burne; cost, $13,500.

Plan 73—Railroad av., e. s., 125 ft. s. 172d st., 1 frame dwelling, 20x25, 2 stories, shingle roof; o., J. J. Conklin, 105 E. 125th st.; c., N. Lvalve, 121st st., near 3d av.; cost, $1000.

Plan 74—N. s. 89th st., 100 ft. w. 3d av., 1 brick ten't, 25x55, 5 stories, tin roof and iron cornice; o. and b., Morris R. Williams; a., Chas. Wright; cost, $11,000.

Plan 75—N. s. 117th st., 124 ft. e. 1st av., 4 brick tent's, 18.6x50, 4 stories, tin roofs, iron cornices; o., Maria Moore, 311 E. 113th st.; a., b. and c., Hiram Moore; cost, $6000 each.

Plan 76—N. s. 127th st., 175 ft. e. 10th av., 1 refrigerator building, Phund's patent, 52x82x110, 1½ stories, gravel roof; o., David Yungling, cor. 128th st. and 10th av.; a., Anthony Phund, 232 W. 36th st.; cost, $20,000.

Plan 77—438 W. 17th st., 1 brick workshop, 25x91, 1 and 2 stories, tin roof; o., Saidler & Co., 444 W. 17th st.; a., Alex. H. McKean, 309 W. 37th st.; c., John L. Hamilton. 350 W. 27th st.; cost, $4000.

Plan 78—N. s. 56th st., 50 ft. w. 4th av., 3 brown-stone dwellings, tin roofs and iron cornices, hot-air furnaces; o., Henry Grear, 87 E. 56th st.; a., D. & J. Jardine, 1267 Broadway; b., Samuel Lowden, 439 W. 43d st; c., John Geagan, 420 W. 25th st.; cost, $14,000 each.

Plan 79—N. s. 66th st., 259 ft. e. 5th av., 2 first-class brown-stone dwellings, 22x19x62, 4 stories and basement, tin roofs and iron cornices; o., C. W. Luyster, 359 W. 52d st.; a., James E. Ware, 697 Broadway; cost, $25,000 and $22,000.

Plan 80—418 to 426 W. 38th st., 1 brick brewery and fermenting house, plastic slate roof, brick and iron cornices; o., Wm. Brown, 49 Broadway; a., Lederle & Co., 196 Broadway; cost, $50,000.

Plan 81—368 Broadway, 1 brick store, 25x149, 5 stories and basement, tin roof and iron cornice; o., J. B. Snook; cost, $40,000.

Plan 82—N. s. 49th st., 120 ft. w. 8th av., 1 car stable, 325x93.5, 3 stories, gravel roofing and brick cornices; o., Eighth Ave. R. R. Co., 50th st.; a., John Carrego, 141 Broadway; cost, $60,000.

Plan 83—17 Clinton st., rear, 1 brick workshop, 25x26, 4 stories and basement, tin roof and iron cornice; o., D. Zimmerman, 13 Clinton st.; b., John Fish, 37½ 7th st.; cost, $3700.

Plan 84—N. s. 66th st., 159 ft. e. 5th av., 2 first-class brown-stone dwellings, 25 and 22x62, 4 stories and basement, tin roofs and iron cornices, dumb waiters and hot-air furnaces; o., C. W. Luyster, 359 W. 52d st.; a., James E. Ware, 697 Broadway; b. and c., not selected; cost, $27,000 and $24,000 respectively.

Plan 85—165, 167, 169 and 171 Av. A, 4 brick ten'ts, 23x76, 5 stories, tin roofs and iron cornices; o., Louis Rollwagon; a., Wm. Josie, Bible House; cost, $11,000 each.

Plan 86—334 Canal st., 1 brick storage, 25x116, 5 stories, tin roof and iron cornice; o., William Mitchell, 60 W. 9th st.; a., William E. Bloodgood, 16 W. 12th st.; c., C. E. Hadden & Bro., 102 S. 5th av.; cost, $32,500.

Plan 87—136 and 136½ Mulberry st, 1 brick factory, 50x88, 5 stories, tin roof and iron cornice; o., G. L. Yaeger, 69 Wooster st.; a., William Graul, 12 Stanton st.; b. and c., not selected; cost, $16,000.

Plan 88—E. s. Concord av., 150 ft. n. 165th st., 1 frame stable and carriage house, 18x30, 2 stories, gravel roof; o., J. B. Harr ott, on premises; c., E. O'Brien, Morrisania; cost, $400.

Plan 89—N. s. 46th st., 275 ft. w. 5th av., 1 brown-stone dwelling, 25x60, 4 stories and basement, tin roof and iron cornice; o., James G. Lynd, 50 W. 54th st.; a., Wilson & Carter, 44th st. and Broadway; cost, $38,000.

Plan 90—29 7th st., 1 brick flat, 26x65, 5 stories, tin roof and iron cornice; o., Isaac Holchester; a., Jobst Hoffman; cost, $11,000.

Plan 91—396 3d av., 1 brick store and dwelling 24x57 and 65, 5 stories, tin roof and iron cornice; o., Edward Ward, care of architect; a., Wm. Josie Bible House; b. and c., Not selected; cost $10,000.

Plan 92—12 and 14 E. 51st st., 1 brick stable, 46x29.6, 2 stories, gravel roof, brick cornice; o., the F. and M. Shaefer Brewery, on premises; a., Wm. Josie; cost, $3000.

Plan 93—W. s. 66th st., 206 ft. w. 6th av., 2 first-class brown-stone dwellings, 25 and 28x62, 4 stories, tin roofs and iron cornices; o., C. W. Luyster, 359 W. 52d st.; a., James E. Ware, 697 Broadway; b., Sinclair & Mills; cost, $30,000 and $32,000 each.

ALTERATIONS.

Plan 79—240 W. 16th st., to put in new stairway from 1st to 2d story; also to remove present front of 1st story and put in iron girder and new show window; o., J. Cunningham, 130 Clinton Place; c., David Wilkie, 239 W. 18th st.

Plan 80—E. s. St. Anne's av., cor. 156th st., a cool ship to be set at the top of present roof, 44x50, for brewery use; o., W. & Ph. Ebling, on premises; a., A. Phund, 232 W. 36th st.

Plan 81—N. s. 49th st., 445 ft. w. 8th av., to rebuild the e. s. wall and front wall of blacksmith shop; also to do all necessary repairs; o. and b., Eight Av. R. R. Co.; a., John Corrigi.

Plan 82—20, 22 and 24 Exchange place and 63 and 65 Beaver st., fronts on Exchange place, to be taken down to 2d story sill course and rebuilt; fronts on Beaver st. to be raised to suit hight of roof when raised; for U. S. Naval Office; o., Royal Phelps, 24 Exchange place; a., Thos. R. Jackson; cost, $20,000.

Plan 83—240 E. 33d st., to build brick ext'n 18x42, 1 story, tin roof; o., C. Kahrs, 240 E. 33d st.

Plan 84—7 Washington st., to build brick ext'n 96x10, 4 stories, tin roof; o., P. Tully on premises; c., F. McCabe, 17 Catherine st.

Plan 85—156 and 158 Broadway, to add 2 stories on an office bldg., with mansard roof; also put in elevator; o., estate of D. H. Haight, 115 Broadway; a., S. D. Hatch.

Plan 86—46 Bond st., to take out center piers in basement and 1st story and put in box lintels and iron columns; o., W. F. Allan, Philadelphia; a., C. F. Burns, 85 8th av.; b., Saml. Lowden.

Plan 87—114 Livingston st., to remove present store front and put in cast-iron girder and iron columns and new show windows; o., H. H. Child, executor; b., Edward Smith, 47 Ann st.

Plan 88—272 Canal st., stairs to be altered and four 8x10 inch girders put under store floor, and new store front put in; o., Isaacs & Samuels, on premises; c., John B. Doyle, 266 Elizabeth st.

Plan 89—430 Washington st., to add 2 stories on pattern shop, with flat tin roof and iron cornice; o., Fletcher, Harrison & Co., 266 West st.

Plan 92—446 E. 10th st., to remove all partitions in 1st and 2d stories and adapt building for cigar factory; o., Levi Bros., s. e. cor. Av. D and 10th st.; a., C. T. Ridder, 672 8th av.

Plan 93—231 Av. A, to take down front wall and put in new iron store front, and build up brick front; o., Geo. Keifer, 231 Av. A.; a., Jobst Hoffman, 19 Union Square.

Plan 94—52 and 54 William st., to take brick pier in basement story and put in iron columns; o., Islin Warner's attorneys, on premises; b., Lyons & O'Brien, 29th st. and East River.

Plan 95—340 Bowery, to repair damages by fire and restore building to its former condition; o., M. Hautman, on premises; b., Ed. Smith, 47 Ann st.

Plan 96—309 E. 27th st., to take out front of 1st story and put in iron girder and new store front; o., T. W. Decker, on premises; b., J. V. Mettler, 330 E. 27th st.

Plan 97—301 Mulberry st., to add 1 story on brick dwelling and substitute flat tin roof and iron cornice for present peak; o., Richard A. Storrs, controller's office; a., Victor Seaman, 242 E. 105th st.

Plan 98—315 Grand st., to repair damages by fire and restore building to its former condition; o., Catherine Crowe, on premises; a., W. H. Holmes, 128 India st., Greenpoint.

Plan 99—317 Grand st., to repair damages by fire and restore building to its former condition; o., Catherine Crowe, 315 Grand st.; b., J. & J. Van Riper, Hunters Point; c, Holmes & Bro.

Plan 100—319 Grand st., to add 1 story on store and dwelling and substitute flat tin roof and iron cornice for present peak; o., Lorillard estate, 3 Mercer st.; b., J. Demerest; c., E. Andever, 49 Eldridge st.

Brooklyn.

Plan 49—Grand st., near Morgan av., 1 brick storage shed, 30x54, 1 story, gravel roof; o., J. M. Wm. Brookfield, 115 Taylor st.

Plan 50—S. s. Grand, 400 ft. w. Morgan av., 1 brick glass factory, 50x70, 1 story, gravel roof; o., J. M. Wm. Brookfield.

Plan 51—Prospect Place, near Rogers av., 3 frame dwellings, 16.8x45, 3 stories and basement, tin roof; o., W. H. Couzens; a., John Van Wagner.

Plan 52—N. w. cor. Tompkins and Putnam avs., 1 brick dwelling, 20x40, 2 stories and attic, tin roof; o., a. and b., Daniel B. Norris, 417 Putnam av.

Plan 53—Kent av., near Rush st., 1 brick factory, 81.3x30, 2 stories, gravel roof; o., Wm. Schroeder, 78 Morton st.; a., A. Herbert, 117 N. 5th st.; c., Andrew Scheld, 60 Montrose av.

Plan 54—S. s. Clay st., 400 ft. e. Manhattan av., 1 frame ten't, 25x38, 3 stories, gravel roof; o. and c., James Mullins, 112 Clay st.; a., James Mullhaul, 198 Greenpoint av.; b., Samuel Beamish, 135 Oakland st.

Plan 55—N. s. Ainslie st., near Union av., 1 frame dwelling, 20x34, 2 stories and basement, tin roof; o. and c., R. B. Ferguson, 250 Hewes st.; a., W. H. Gaylor, 110 South st.

Plan 56—Wyckoff st., bet. 4th and 5th avs., 3 brick dwellings, 20x45, 3 stories, gravel roofs; o., George W. Brown, 728 Fulton st.; c., C. E. Cozzens.

Plan 57—N. 10th st. and 11th, 64 ft. e. 6th st., 2 frame sheds for chemical works, 40x31x53x60, 1 story, asbestos roofing; o., Ross Chemical Co., N. 11th and 6th sts.

Plan 58—S. e. cor. 26th st. and 3d av., 1 frame stable and coach house, 22x80, 1 story, gravel roof; o., Chas. Beck, 773 3d av.; c., Raxmaker.

Plan 59—S. e. cor. Adams and Nassau sts., 1 brick ten't, 25x54, 4 stories, tin roof; o., Mrs. M. E. Demarest, 4 Watts st., New York; a., Sam'l Bennett, 192 Concord st.; c., Jenkins & Gillies, 370 S. 5th st.

Plan 60—S. e. cor. 2d and Hamilton av., 1 frame workshop, 20x36, 1 story, gravel roof; o., John Haber, 657 3d av.

Plan 61—N. s. Van Dyke st., 200 ft. w. Dwight st., 1 frame storage, 20x30, 1 story, tin roof; o., M. O'Neil, 158 Dykman; c., C. Detelson, 165 Van Dyke st.

Plan 62—N. e. cor. Bushwick av. and Cornelia st., 4 brick dwellings, 16.8x45, 3½ stories, tin roofs and Baltimore heaters; o., Thos. Morgan, 53 Bleecker st., New York; a., Thos. F. Houghton, 340 Fulton st.

ALTERATIONS.

Plan 38—175 17th st., to build brick ext'n, 14x20, 1 story and basement, tin roof; o., Samuel Roebuck, 20th st. and 3d av.; b., Wm. Corrigan, 646 6th av.

Plan 39—N. e. cor. Clinton and Fulton avs., to put in partitions in 2d story and adapt it for dwelling; o., F. A. Platt, 450 Clinton av.; b., P. C. Kane; c., Joseph J. Kirby, 73 Gates av.

Plan 40—25th st., near 5th av., to build brick ext'n, 12x17, 1 story, tin roof; o., Mrs. William Pittado, 204 25th st.; c, Edward Parson, 19th st., bet. 3d and 4th avs.

Plan 41—6 and 8 Charles place, to build frame ext'n, 25x40, 3 stories, tin roof; o., Thos. Lynn, 6 and 8 Thomas st.; c., M. Horring, Floyd st.

Plan 42—197 Park av., to remove center pier in basement and put in new show windows; o., Mrs. Pechin, on premises; c., J. C. Rustin, 142 Adelphi st.

Plan 43—16th st., near Coney Island road, to repair damage by fire, and restore building to its former condition; o., Ritch Ornet; b., John Van Riper, 292 14th st.

Plan 44—381 Grand st., to repair damage by fire and restore building to its former condition, with new fire-proof roof; o., C. Burne estate; c., D. Kinkade, 344 Court st.

Plan 45—396 Myrtle av., to take out 10 ft. of party wall on 1st story and put in iron girder and arch over same; o., Samuel Booth; c., Long & Barnes.

Plan 46—45 Bartlett st., to raise frame dwelling 10½ ft. and build frame story under same; o., Louis Kunz; a., John Kraus.

Plan 47—671 DeKalb av., to remove stairs from main building to ext'n and put in new girder in basement; o., F. C. Vrooman, 444 Gates av.

Plan 48—Cor. Carroll and Hoyt sts., to put in 12x12-in. girder and new show window; o., M. Simpson, on premises; b., Shanley & Cody, 464 Smith st.; c., Robt. Kelly, 190 Sackett st.

Plan 49—336 18th st., to raise frame dwelling 2 ft., and build brick foundation under same; o., Mrs. Coggswell, 219 Montague st.; c., A. H. Arnold, 15 Butler st.

Brooklyn.

Feb. 2—S. s. Hayward st., 183 ft. e. Lee av., thence e. 90x100; Messrs. McGrath & Geary, agt. Christian Zanger, Marcus Videtto, Amelia Davis and Eliza A. Fenton, debtors, and John Davis, Christian Zanger and Marcus L. Videtto, owners—claim, $180.

Jan. 31—W. s. Foster av., 300 ft. s. Old Coney Island road, s. 200x100; H. S. Christian agt. Thos. Shannon, debtor, and A. Fullan or Fuller, owner—claim, $330.50.

Feb. 3—Same last-described premises; William Flaherty agt. Thomas Shannon, debtor, and A. Fullan or Fuller, owner—claim, $30.

Feb. 4—N. s. Green av., 150 ft. e. Bedford av., thence e. 100x100; Messrs. Howell, Saxton & Co. agt. Levi Fowler, debtor and owner—claim, $900.

Feb. 4—S. s. Gates av., 95 ft. e. Yates av., thence 100x100; Messrs. Howell, Saxton & Co. agt. Levi Fowler, owner and debtor—claim, $369.19.

Feb. 2—S. e. cor. Smith and Livingston sts., 20 ft on Livingston st. and 75 ft. on Smith st.; Gustave Schmidt agt. C. J. Archer, debtor, and James McCormack, owner—claim, $150.

Jan. 30—N. w. cor. Union st. and 5th av., thence n. 60x60; James Gowdy agt. Lilian F. Robbins and Thomas H. Robbins, owners and debtors—claim, $100.

Jan. 30—N. w. cor. Union st. and 6th av., thence n. 36x92; James Gowdy agt. Lilian F. Robbins and Thomas H. Robbins, owners and debtors—claim, $100.

Feb. 2—S. s. 4th st., 85.10 ft. e. 5th av., thence e. 100x100; Christian F. Hommell agt. Silas M. Styles, owner and debtor—claim, $308.

Rumsey & Co., of Seneca Falls, N. Y., make a very complete line of most excellent pumps for all purposes and uses, besides a large assortment of hand fire engines and other hydraulic machines. The works of Rumsey & Co. were established in 1840, and they now employ 200 skilled hands in the manufacture of these wares. Their pumps are shipped to all parts of the world, and are as well and favorably known abroad as at home, from their thorough workmanship and efficient operation. The most improved machinery and patterns, as well as the best materials, are used in their construction, and large new machine shops are now being added to the already extensive works of this concern. They have just issued a handsomely illustrated catalogue of 230 pages, comprising over 800 different styles and sizes of their leading hand and power pumps, &c., which may be had upon application either at their factories at Seneca Falls, N. Y., or at their principal warehouse, No. 93 Liberty street, New York city.

Col. Clark, the water registrar of Holyoke, Mass., has been invited by the officers of the Oakland (Cal.) Water Works to give them some hints about the Holyoke management. The State law there requires them to furnish the city all the water needed for fires, irrigating the public grounds, sprinkling the streets, &c., without charge, and they want to get data for a movement toward changing the law. Holyoke pays $3000 a year for the water used at fires, and the street sprinklers pay according to the amount used, these two items being nearly enough to pay the cost of maintenance.

Attention is invited to the advertisement, on another page, of the Ansonia Brass and Copper Co., manufacturers of Brass and Copper, also Corrugated Stove Platforms and "Ansonia Gold Bronze" and other specialties.

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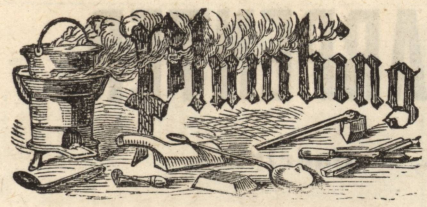


Explosions of Gas in Sewers.

Several explosions of gas in sewers have recently taken place and caused no little destruction of property. The *American Architect and Building News* comments upon the San Francisco explosion as follows:

"An accident which happened in San Francisco not long ago illustrated an unexpected danger from bad drainage. A Mr. Cullen, plumber and gas-fitter, noticed a smell of escaping gas in his house, and having traced it to a water-closet, investigated it with a lighted match. A tremendous explosion followed, which tore the plumbing apparatus to pieces and injured the investigator. By a simultaneous explosion in the connecting Eighteenth-street sewer, the street was torn open from Jessie street to Mission street, and a great blaze of gas went up from a broken gas main at the corner of Mission street. With a curious simplicity, the fire department brought a hose and spouted water at the escaping gas in vain for an hour, we are told, before it was decided to put out the flame by burying the outlet under the upheaved earth, which was finally done, or by cutting off the gas, which might have been done, one would think. Examination showed that the trouble lay with the sewer, which, being old and of wood, had decayed. It had sunk in at the crossing of Mission street a week before, and in doing so had broken the gas main which passed beneath it. The escaping gas had gradually filled the adjacent sewer for a long distance, mixing with the contained air into an explosive compound, which made its way into the houses along the street, or at least into Mr. Cullen's. It is not strange that a city built in haste, as San Francisco was, should have wooden sewers, if it were sewered at all; but it would seem to be evidently time to do away with them now. One could have supposed, too, that the interval of a week would give time to find out and cure whatever mischief had been done by the caving in of a sewer at a street crossing. The explosion itself is an illustration, of which many are to be found, of the dangers of the gas-fitter's common trick of going about with a light in search of leaking gas. An exploded plumber under such circumstances might, perhaps, take comfort in that his irruption has taken the place of typhoid fever or diphtheria, and be warned in time to no longer arrange his drains or soil pipes so as to conduct gas into his house, while his customers might possibly benefit by his opportunity to learn necessary precaution at his own expense rather than at theirs. A curiously similar accident happened at about the same time in Oakland, across the bay, where gas from the gasometer had escaped into the brick sewers, and, permeating the adjoining houses, in due time blew up in two of them"

Gas explosions in sewers are by no means uncommon, nor are they to be looked for entirely in hastily built cities. On Sunday, the 4th of January, an explosion of considerable violence took place about 10 o'clock in the evening at the corner of Forty-second street and Sixth avenue, in New York. The explosion seems to have been a double one, the first disturbing the pavement in two places, and the second blowing off several manhole covers in Forty-second street, three of which were smashed, and breaking glass in the windows along the street. The number of explosions which have taken place in sewers recently, and the apprehension which has been created in the minds of many persons by sensational reports, makes it a matter of some interest to inquire into the causes of these explosions and the circumstances attending them.

Although generally reported under the head of explosions of sewer gas, they are invariably explosions of illuminating gas, which has escaped from the gas pipes and found its way into the sewers, cellars or drains of houses. The reason for the accumulation of gas at these points is not at first readily seen. Both sewers and houses act as chimneys The air within them is warmed, and consequently lighter than the external air, which is constantly tending to flow in and displace the warmer air. This keeps up a constant motion of the air toward the warmer places. This motion extends not only to the air above the ground, but also to that within the soil. In consequence, when a gas main bursts or leaks, the first places in which we expect to find gas are the cellars and sewers. The sewers usually get the gas first, as they are nearest to gas mains.

The streets at the point where the explosion first took place, Forty-second street and Sixth avenue, are a labyrinth of pipes. Five lines of gas mains pass down the avenue and five other gas mains cross these at Forty-second street. Besides there are the lines of Croton mains in both streets. To make matters worse the foundations for the elevated railroad had to be put down in this network, and as there is a station at this point, space had to be provided for several extra foundations. Through the kindness of Mr. Allan Campbell, Commissioner of Public Works, and Mr. Stevenson Towle, the engineer in charge of the sewers, we have obtained a great deal of information in regard to this particular explosion, as well as several others which we shall mention further on.

The accompanying sketch, furnished by Mr. Stevenson Towle, is a plan of the intersection of Forty-second street with Sixth avenue. It shows the location of the car tracks, sewers, water pipes and as nearly as possible the number and position of the gas pipes. Considerable difficulty was encountered in obtaining the location of the gas pipes and their sizes, and in this much aid was received from Mr. Webster, the head of the drawing department. Few people, not directly familiar with underground work, would imagine that such a network of pipes and sewers could be found under our more important streets. First and deepest are the sewers, from 8 to 13 feet under the surface, then comes the water pipes, about 4 feet deep, and finally the pipes for the gas, which are from 2 feet 6 inches to 4 feet underground. The latter are the most numerous, and in some respects most dangerous. The net work of pipes crossing and branching at Forty-second street into Sixth avenue is by no means an unusually complicated one. There are many other intersections in the city which would show an even worse condition of things than this.

The cut shows a plan of the pipes, sewers, &c. B represents one of the first sewers put through this portion of Forty-second street. It was built to drain the gate of the Forty-second street reservoir and carry off the water when the reservoir was emptied. It originally crossed Sixth avenue and discharged on what were then the flats toward Seventh avenue. Ultimately the sewer L H was built, and B was connected with it by a sharp incline, as B is only 8 feet below the pavement, while L H is 5 feet deeper. When the Sixth avenue sewer was built this was cut off, and as the drain from the reservoir was never used it was cut off, the only connection made was by a 12-inch tile pipe, as shown at C. The sewer K was built to meet the wants of the north side of Forty-second street. The end of the sewer L H turns sharply upward at its end where it formerly crossed Sixth avenue. Besides these three sewers, which are 48 inches in diameter, we have a 48-inch Croton main passing through the street, with two branching down Sixth avenue. One of these is 36 inches in diameter. A 6-inch Croton pipe runs through Forty-second street in addition to the large pipe. West of the avenue there are no less than five gas pipes, some of which are said to be of large diameter. There are two small gas mains for supplying the houses on each side of the street, each of the two rival gas companies putting a service main on each side. In Sixth avenue the sewer D is 13 feet below the surface and about 4 feet in diameter. It takes the drainage from the two basins on the corners. On the east side of the avenue above Forty-second street there are two gas pipes and a 6-inch water pipe, while below there is in addition a 36-inch water pipe. The other side of the street has three gas pipes and a 12-inch water main. Among these pipes the foundations for the elevated railroad are shown; at the level of the pipes they are nearly twice the size shown, being 8 feet square. Sometimes the pipes were straddled, at others the pipes were taken out and bends laid so as to carry them around the foundations. The continuous digging naturally left the soil in a honeycombed condition, and with one company trenching through or across the back filling of its predecessor, it is not greatly to be wondered at that breaks are common. Twice last winter the drain pipes from the elevated railroad station and the sewer pipes were dug out on account of frost. The ground near the posts is, therefore, in a very loose condition, and the gas from leaking mains readily finds its way through it. The first explosion, it appears, took place beneath a Sixth avenue street car, just as it was starting, at about the point marked E on the sketch. This disturbed the pavement. The pavement was also broken up at the point marked F. The following explosion was in the sewer, and though the man-hole cover at H was not disturbed, three other covers further down the street were thrown out and broken.

It is easily seen from what we have said that only with the utmost care could pipes be kept in line in such a place. We should not omit to say that a great portion of the digging not only here, but all over the city, both for pipes and for the elevated railroads, was done in the winter season, and freezing has constantly hindered the ground from becoming solid. The wonder is that there has not been a multidude of explosions rather than that one or two only have taken place.

It appears that the gas companies are attempting to throw the blame of the explosion upon the Department of Public Works by the statement that the cause is to be found in sewer gases and not in illuminating gas. This is absurd. To find a combustible gas in a sewer which is far removed from any pipe carrying illuminating gas is almost an unheard of thing. The few reported cases are of such a doubtful character that they are not credible. Explosions of illuminating gas in the sewers are very common occurrences, especially in low-lying sewers along the water front. In most of these places the gas pipes are within reach of the salt water in the soil and are beginning to rust out. In such places the soil gets saturated with the gas which is forced into the sewer when it accumulates. In Dover street not long since a plumber without a permit attempted to enter the sewer through a manhole. He sat down upon the edge with his feet inside, and as he stooped forward with a candle to get further in, the explosion took place, which was sufficiently violent to throw him out bodily. He was considerably burned

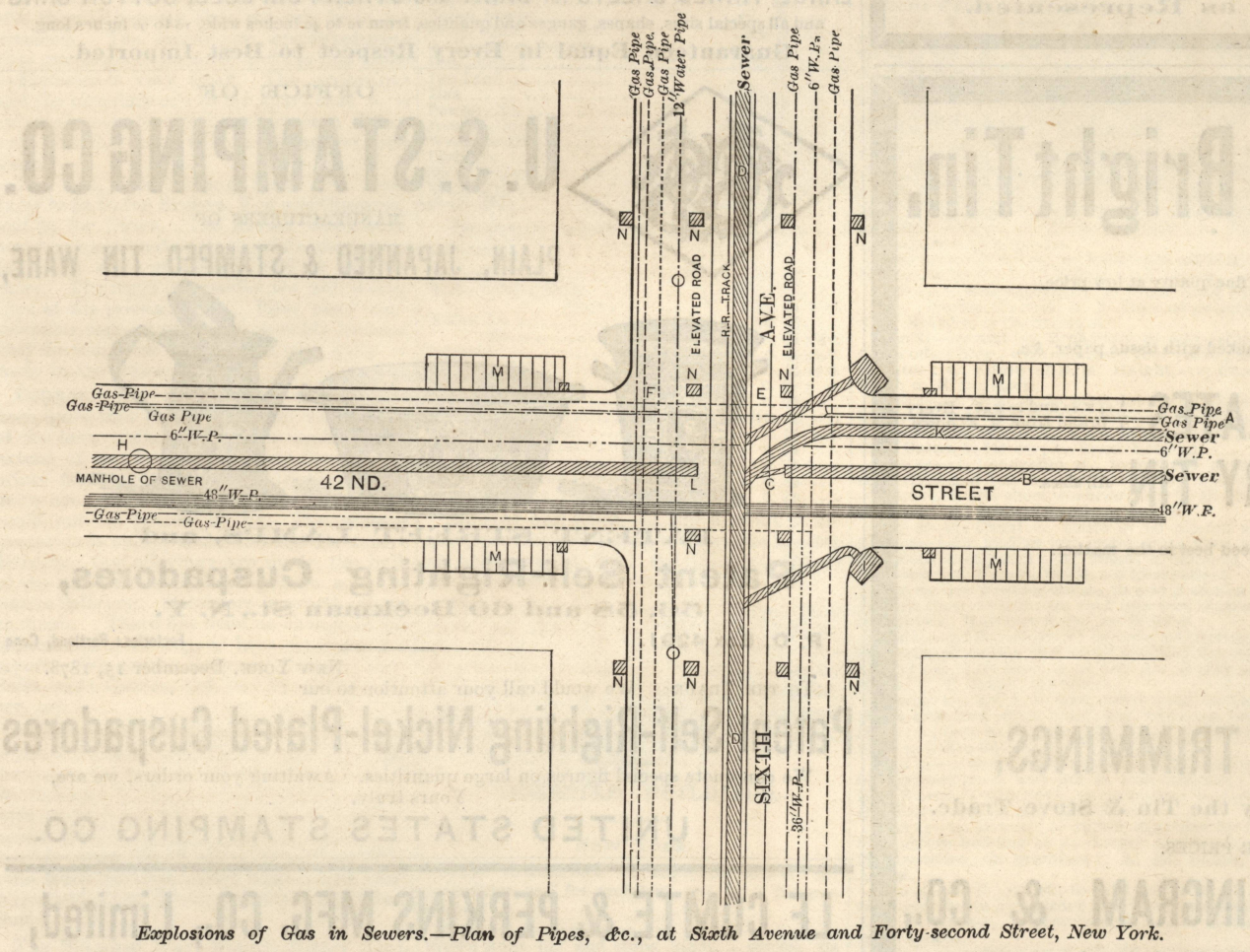
The frequent explosions in open trenches which take place in the neighborhood of leaking gas mains is sufficient to prove the origin of the gas which is so commonly found in the soil as well as the sewers. While some of the more important mains were going down in Williamsburgh there was great trouble in places from the quantity of illuminating gas which filled the soil, owing to the leaky mains of some of the companies. The sense of smell is, in most cases, sufficient to show that to street gas we must look for the cause of these explosions.

Gas leaks are likely to become more numerous in the future than they have been in the past, and if the ventilation of some sewers is not more carefully attended to we may expect more serious explosions than any we yet have had. Ventilation is, in fact, the only method by which the damage can be avoided. If the sewer in Forty-second street had had perforated man-holes of the pattern now adopted by the Department of Public Works, there would have been little or no damage done. Unfortunately, the appropriations do not admit a rapid exchange of the new style of covers for the old. In regard to ventilation, Mr. Towle, in his last report, says:

"In the old system no regular ventilation was provided for; all the ventilation that existed was obtained through the house connections and open drains, also through the leaders for roof water that connected directly with the sewers, and through the untrapped receiving basins.

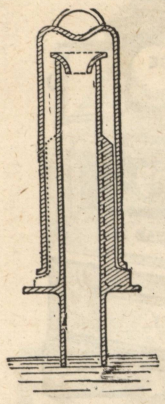
"After the introduction of Croton water, when the sewers came to be used to convey foul matter and refuse, the exclusion of sewer gas became of vital importance, and more carefully devised means of ventilation were absolutely necessary. The pressure on an unventilated sewer, exerted by the rising tide and storm water, and also that due to steam and hot water, aided at times by the force of the wind blowing into the mouths of the sewers, is such that the most effectual sewer trap cannot resist.

"As long as house connections were open and extended untrapped through the roof (remote from chimneys and windows), little other ventilation was required, but it has now become the general practice, as well as a requirement of the Department of Health, to trap the soil pipes as near the sewer as possible, without providing a separate ventilating shaft, and the placing of gates at the permanent sewer outlets, to exclude wind, have cut off ventilation in all directions. It has been found necessary to perforate the covers to the sewer manholes sufficiently to allow of the free escape of sewer gas into the center of the street (as remote from dwellings as possible), where it is so thoroughly disseminated into the atmosphere as to be rendered harmless. In this way, also, air is supplied to the sewers to replace the receding tides and storm flows, and thus providing against pressure from the constant daily fluctuations in the density of the sewer air due to other causes. But sewers that



Explosions of Gas in Sewers.—Plan of Pipes, &c., at Sixth Avenue and Forty-second Street, New York.

A L—Sewer in Forty-second street, formerly connected with B.
H—First manhole from the avenue, not disturbed.
E—Point of first explosion where pavement was disturbed.
F—Pavement disturbed.
B—Old drain from resevoir now cut off, and connected by pipe with Sixth avenue sewer.
C—Twelve-inch tail pipe connecting B with Sixth avenue sewer, D D.
D D—Sixth avenue sewer.
I I—Basins at street corners connect with sewer D D.
K—Sewer from Fifth to Sixth avenues on Forty-second street.
L—Turned-up end of the Forty-second street sewer.
M M—Stairs to Elevated R. R. Station.
N N, &c.—Posts of the Metropolitan Elevated Railroad.



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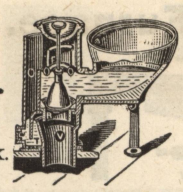

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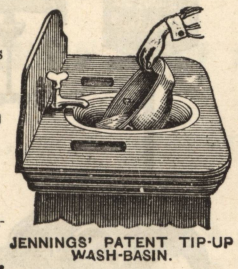

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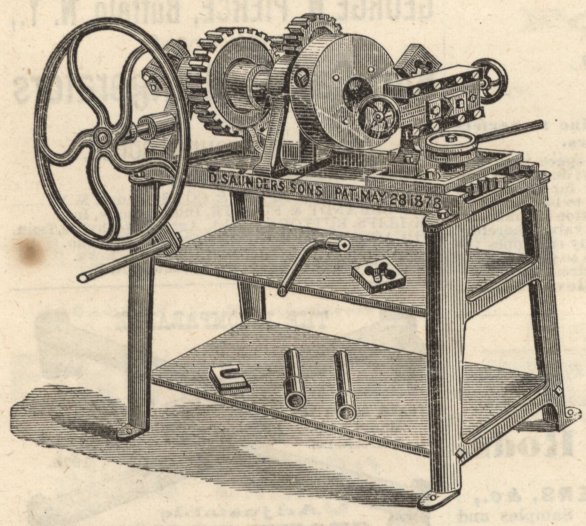

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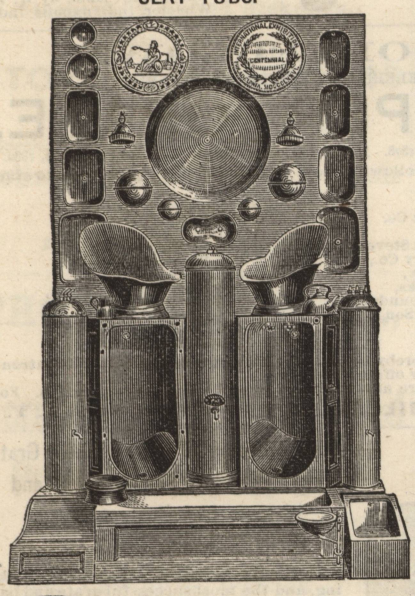

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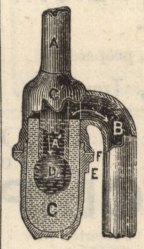

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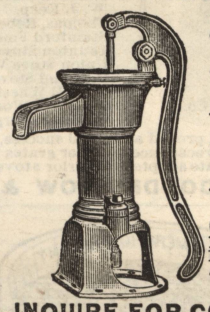

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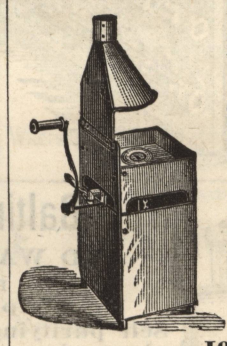

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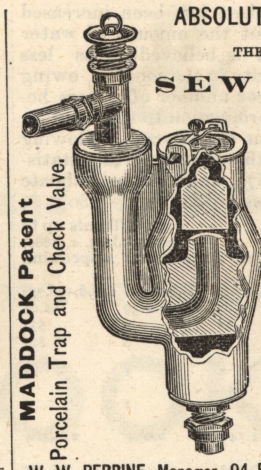

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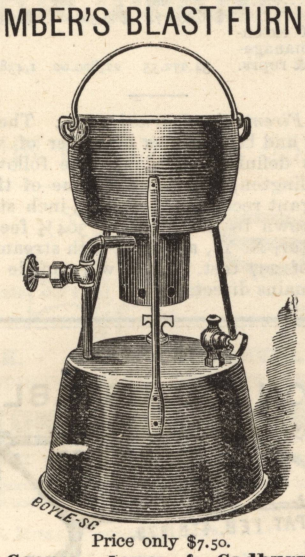

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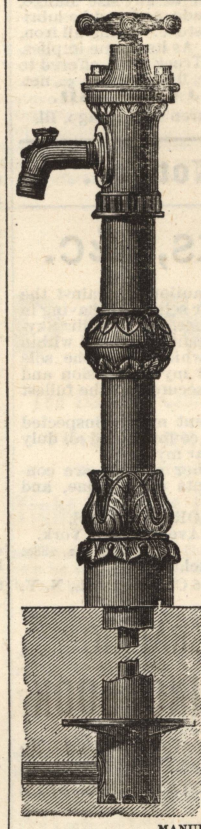

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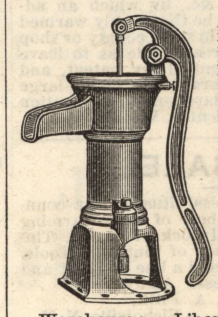

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are laid under the sidewalks, or closely adjoining them, cannot be ventilated through the manholes without annoyance and offense to persons passing near them, and ventilation must be had through the soil pipes, or separate shafts carried untrapped through the roofs.

"As this department is without authority to direct the ventilation of sewers through the house connections, legislation must be obtained that will require owners (as a condition precedent to connecting with the public sewer) to make such provision for ventilation as may be necessary.

"There are some 20,000 manholes provided for the sewers, and as many of these as can be used for ventilation will be fitted with perforated ventilating covers.

"During the past two years several hundred manholes nave been fitted with these covers, with marked effect in many neighborhoods that had suffered from want of ventilation in the sewers."

This extract shows in the plainest manner the importance of leaving each house drain open from sewer to roof. The sewers must be ventilated in order to arrest very serious dangers from explosions, and the house drains are the only feasible means of doing this perfectly.

The complaint against taking the air from the sewers through the houses is of no weight, because it is pretty easily shown that there is no danger in the air in the main sewers. The poisonous gases to which we trace the zymotic diseases are almost without exception produced in the house drains and inside the cellar walls. Once opened to ventilation they disappear, however, and the dangers from leaky pipes or bad workmanship is reduced to a mere nothing.

It seems useless to argue upon this point, since prejudice and vague fear make it impossible for sound argument to be heard. It is to be hoped that the Board of Health will some time be led to see the evil of their rule calling for a trap cutting off house drains from the sewers, and will encourage free circulation of air in all directions.

It does not seem probable that anything will be done until the public is aroused by some serious explosion of street gas.

When the Department of Sewers has time to make a complete change of manhole covers and only the perfor. ted covers are used, there will then be no possible reason for refusing to allow the free ventilation of the sewer through the house drains. This ventilation, however, will be as essential then to prevent explosions as it is now, because the gas will then be accumulating in the house connections, where explosions are likely to cause much damage to private property.

Since the above was prepared another gas explosion, of somewhat different character, has taken place in the upper part of the city. The latter, although not violent, illustrates how dangerous street gas may be in the streets if not under proper supervision. While contractors were at work making an excavation, a rock, thrown out by a blast, struck a gas main which had been exposed in the trench and cracked it. An explosion followed, and the gas burned with a great flame for some time. It was at last smothered with earth, but the leak was not repaired for a day or two. A little change in the circumstances might have made this break in the pipe a very serious matter, involving the loss of both property and life.

It seems apparent, from these accidents, that the most complete control of all gas and water pipes and sewers should be vested in some one department. Some one could then be held responsible, not only for the location of all the pipes and sewers, but also for their proper protection when excavations are to be made. If this is not done, we may expect, in the near future, to find gas explosions and the evils growing out of them becoming very serious At the present time it does not appear that the Department of Public Works has such power nor such resources at its command as to enable it to look after these matters in the manner which is considered desirable.

The Philadelphia *Record* says: Now that the year has closed, the official returns of the departments are beginning to flow in, and, so far as received, the figures show a greater increase in all branches, except it be in the building operations. For instance, the water supplied the city, and which found its way through garden hose, fire hose, water pitchers, milk cans and soup houses, and, in fact, all the city supply, amounted in round numbers to 20,000,000,000 gallons, as against 19,000,000,000 gallons, used in 1878. By fixing the census at 800,000 souls this would be a supply of 25,053 gallons a year to each individual. Reducing the figures to days would give a supply of 68 gallons to each man, woman and child. This would seem ample to keep all clean and from parching with thirst, with a liberal margin for slushing sidewalks and drenching streets.

The following refers to Fall River (Mass.) water works: The revenue during the year 1879 has been larger than any previous year, and the expenses have been less. The number of water takers has been increased during the year, but the amount of water pumped per capita is believed to be less than in any other city in the country, owing to the fact of a larger number of meters being in use here in proportion to the number of service pipes than elsewhere. Following is a comparison of the most important statistics for 1878 and 1879, and also an estimate of total expenditures to January, 1880:

	1878.	1879. Approxim.	Totals up to Jan. 1, 1880. Approxim.
Gallons of watr pumped	439,539,059	460,000,000	2,196,146,773
Pipes laid (mls.)	3.23	0.39	52.05
Hydrants	32	3	537
Gates	18	5	552
Drinking fount. for animals	1	1	15
Drinking fount. for people	0	1	6
Earth trenching, feet	14,141	2,054	215,564
Rock trenching, feet	3,053	15	55,454
Service pipes	264	171	2,495
Meters	287	202	1,368
Revenue	$66,979.74	$69,500.00	$293,073.50
Costs of extension, management & reprs.	34,272.55	22,800.00	1,438,772.40

The *Fireman's Journal* says: The two highest and best throws of water of which there is definite record are the following: At Burlington, Iowa, at the time of the recent Grant reception, a solid 3-inch stream was thrown to the hight of 304½ feet; at Rochester, N. Y., a solid 4-inch stream to a hight of 297 feet. They were made from street mains direct.

ASH'S

IRON ADJUSTABLE

This Truck can be adjusted to any size Range, Cooking or Heating Stove made, and can be lubricated without removing the stove. Being all iron, it is very durable and neat. As its name implies, it is the most perfect Stove Truck ever offered to the trade. Weight of truck, 19 lbs. Price, $2 50, net.
Manufactured by JAMES ASH,
No. 108 W. Van Buren st., Chicago, Ill.

Special Notices.

Skylights, &c.

All persons are hereby cautioned against the purchasing, using, vending or selling, or having in their possession for sale or use, any Metallic Skylights, whether wholly or in part embraced within certain Letters Patent of which I am the sole and exclusive owner, without my permission and license, as such will be prosecuted to the fullest extent of the law.

Copies of said Letters Patent may be inspected at my office, or that of my counsel, and all duly authorized Skylights will bear my label.

All so-called patents of other persons are contingent to, and infringements upon, mine, and calculated to deceive.

GEORGE HAYES,
71 Eighth Avenue, New York.
January 1, 1880.

By his Attorney and Counsel,
JAS. H. WHITELEGGE, 136 Chambers St., N. Y.

THE STYLOGRAPHIC

LETTER COPYING BOOK.

Letters written and copied at one writing. No Ink. No Press. No water used. ALL BUSINESS MEN USE THEM. ALL STATIONERS SELL THEM.

Send for Circular to the Manufacturers

J. S. McDONALD & CO,
Blank Book Makers, 158 and 160 Clark St.,
CHICAGO, ILL.

Important to Stove Dealers.

My Patent Air-Heating Attachment for Cooking and other Stoves, Ranges, &c., by which an adjoining or upper room can be thoroughly warmed by one fire, is now for sale in state, county or shop rights. My terms are so reasonable as to leave no room for an infringement of my patent, and at the same time so liberal as to insure large profits to the trade. Circulars sent on application to J. M. PATTERSON, Patentee, Woodbury, N. J.

FOR SALE.

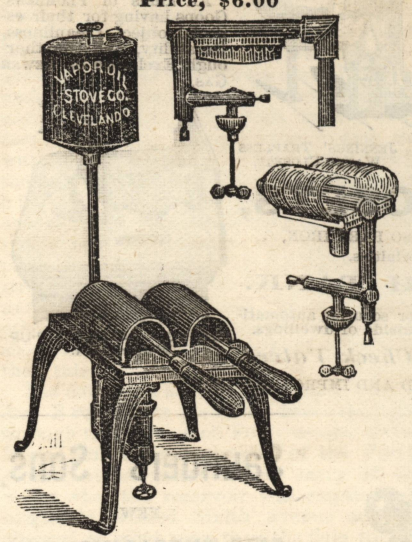
A well-established business, situated in a country town, with the very best of dairy farming country all around, a small stock of Stoves, Tinware, Glassware and full set of Tinman's Tools. A splendid opportunity to add a line of Shelf and Heavy Hardware to business. Address
C. A. FISK,
Nicholville, N. Y.

For Sale Cheap.

A stock of Tinware and Tools; also, lot 23 x 139 feet, on which is situated a two-story frame building 20 x 30 feet, with workshop 18 x 20 feet. A good opportunity for a tinner to buy and put in a stock of stoves. Reason for selling, wishes to go into some other business. For further particulars address
B. GOODMAN,
Auburn, Ind.

Soldering Furnace.

Price, $6.00



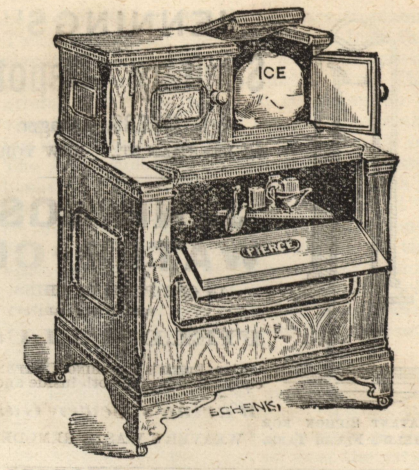
Will Burn Coal Oil or Gasoline to perfection with our Burners.

The best in market; occupies less space than any other. Its advantages are, simplicity, durability and costing less than other heaters. Is far superior to charcoal; the coppers do not require to be tinned as often; it can be lighted and in operation in a minute; the flame is adjusted by turning the valve, therefore wasting no time or fuel. It completely envelopes the irons, and the intensity of the heat is so great that it will heat the largest sized irons. Address
VAPOR OIL STOVE CO, Cleveland, O.

Nickel Plated Rods,

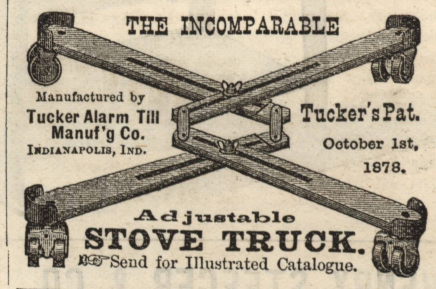
FOR
STOVES, STOVE POKERS, &c.,
Made from our Ornamental Wire. Samples and estimates free to the trade.
We also manufacture Air Guns, Air Gun and Pistol Ammunition, Nut Picks, Stair Rods, Foot Lathes, &c., &c.
H. M. QUACKENBUSH, Herkimer, N. Y.

POLISH YOUR NICKEL WITH
SILVER STAR POLISH.
Best Thing Out.
Send 15 cents for sample by mail, prepaid, to
GILES STOVE CO., Troy, N. Y.

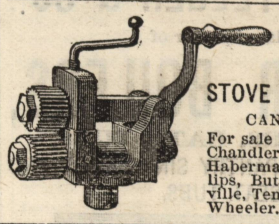


GEORGE N. PIERCE, Buffalo, N. Y.,
Manufacturer of
Bird Cages, Refrigerators
AND
HOUSE FURNISHING GOODS.
Send for Illustrated Catalogue.
KENNEDY, SPAULDING & CO, Syracuse, N. Y.
HILDEBRANDT & FUGATE, Indianapolis, Ind.
PHILLIPS, BUTTORFF & CO., Agts. at Nashville, Tenn.
CHICAGO STAMPING CO., Agents at Chicago.
J. MACLAY & CO., Agents at Dubuque, Iowa.
BUTLER & DIEL, Agents at Syracuse, N. Y.

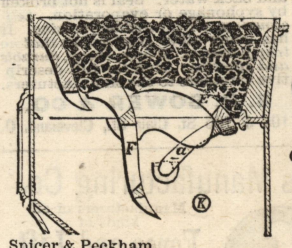
THE INCOMPARABLE



Send for Illustrated Catalogue.



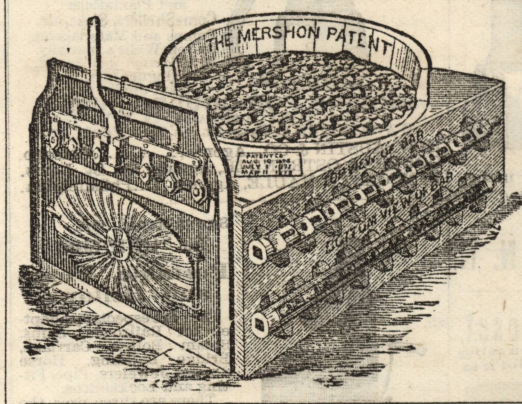
WHEELER'S
Improved
STOVE PIPE FLUTER
CAN'T BE BEAT.
For sale by Cragin Bros. & Chandler, Chicago, Ill.; F. Haberman, New York; Phillips, Buttorff & Co., Nashville, Tenn. Made by W. A. Wheeler, Indianapolis, Ind.



GOODFELLOW'S
CELEBRATED INTERCHANGEABLE
CLIPPER GRATE.
Patented Nov. 5, 1878. Improved, 1879. Improved and Patented, 1880.
Adopted by the following Stove manufacturers in preference to other Grates:

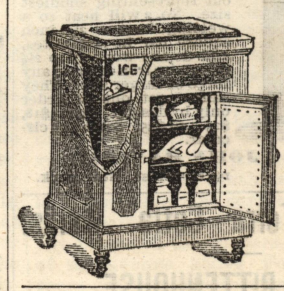
Perry & Co.
Burdett, Smith & Co.
W. J. Keep.
Thomas, Roberts, Stevenson & Co.,
Stamford Foundry Co.,
Taunton Stove Co.,
Union Stove Works,
Portland Stove Foundry Co.
Russell Wheeler, Son & Co.,
Sill Stove Works,
Collins & Burgie,
Highland Foundry Co.,
G. H. Phillips & Co.,
A. P. Corse & Co.,
Bussey, McLeod & Co.,
J. Van Wormer & Co.,
Detroit Stove Works,
Richardson, Boynton & Co.,
Cox, Whiteman & Cox,
W. C. Davis & Co.,
Myers, Osborne & Co.,
and others.
Spicer & Peckham,
Magee Furnace Co.,
Ely & Ramsay,
Michigan Stove Works,
Smith & Anthony Stove Co.,

Has stood the test and proved a decided success, thereby receives the highest indorsement of its patrons, who believe it will take precedence of other grates now offered to the trade.
Designs of the Clipper Grate adapted to Parlor Stoves are now ready, and can be had on application. For terms address, GOODFELLOW & MILLER, 359 Second Street, Troy, N. Y.



The "Mershon" Patent Shaking Grate and Bar for Steam, Cast and Wrought-Iron Heaters, Steam Boilers, &c.

This is the most complete, easiest working, and the most successful grate and bar ever invented. The attention of manufacturers of boilers and heaters is especially called to it. It has the largest air surface of any grate manufactured, and will generate more heat and steam with the same amount of coal than any other grates. Several sizes supplied, ranging from 18 inches to 30 inches diameter fires. Send for descriptive circular. For license to foundries and others to manufacture address Pennsylvania Heating and Ventilating Works, N. W. Cor. Twelfth and Filbert streets, Philadelphia, Pa.



The Baltimore Climax Refrigerator
AND WATER COOLER COMBINED.
Patented Dec. 2, 1873—June 1, 1875.
No Drip Pan to Soil the Carpet.
Self purifying. Cold, Dry and Pure Atmosphere. Inner case made entirely of Galvanized Iron.
MANUFACTURED AND FOR SALE BY
R. ARMIGER & SON,
12 Second St., Baltimore, Md.
Send for Illustrated Catalogue and Price List.

ESTABLISHED 1833.

W. F. Potts, Son & Co.,

Iron OF EVERY DESCRIPTION, & IMPORTERS OF **Tin Plate.**

Office, 1225 Market St,
Warehouse:
1230, 1232 and 1234 Filbert St.
PHILADELPHIA

CORSE & CO.,

STOVE MANUFACTURERS, 399 and 401 RIVER ST., TROY, N. Y.,

Successors to EDDY, CORSE & CO.

RANGES & COOK STOVES

For the Spring Trade.

Send for Price List and Circulars.

New York Agent for Stoves and Repairs, JOHN DERUNDEOU, 258 Water street.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings.

Cylinder Brick, &c., &c.

NEW YORK Nickel Plating Co.,

Licensed by United Nickel Co.,

Manufacturers of

STOVE DOOR KNOBS and TURNKEYS.

Special attention given to

Polishing & Plating all kinds of Stove Work.

18 Park Place, New York City.

THOMAS, SON & CO.,

Manufacturers of

Screw, Lever, Drop and Power Presses, Dies,

and Patent Improved

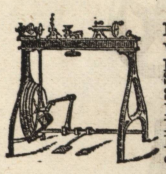
Double Eccentric Cornice Brake.

227 W. 2d St., Cincinnati, O.

Send for circular.

ISRAEL H. JOHNSON, JR., & CO.

Tool and Machine Works,



Manufacturers of Lathes of all varieties (for foot or steam power), with their supplies, Screw, Lever and Drop Presses, Shears, Jewelers' Tools and Machinery. Also, Mortimers' Patent Rapid Transit Wrench. Designing and Building of Special Machinery, Mill Work, &c.

Office, 440 N. 12th St., Philadelphia.

YATES' SUPERIOR LIQUID STOVE POLISH.

Patented Jan. 19, 1875.

GUARANTEED THE BEST. IT HAS NO EQUAL.

NO LABOR—NO DUST.

Six years in the market. The demand constantly on the increase. With this polish one man can polish from three to five Stoves (average sizes) in one hour.

One application will protect a stove from rust in the dampest places.

Warranted to be Precisely as Represented.

This Polish must not be confounded with the stove varnishes and stove paints that have been forced on the market during the past few years.

Send for Circular. Manufactured exclusively by **YATES & CO., Rockford, Ill.**

For sale by SIDNEY SHEPARD & Co., 86 Lake St., Chicago. Ill.; SOLAR STOVE WORKS (L. D. Wynn, Agt.), Kansas City, Mo.; JOHN DERUNDEOU, 258 Water street, New York City; WESTERN STOVE MFG. CO., 306 N. Main St., St. Louis, Mo.; SIDNEY SHEPARD & Co., 68 Main St., Buffalo, N. Y.

Pat. Mineral Wool.

A. D. ELBERS, 26½ B'way, N. Y.

Address P. O. Box 4461.

FIRE STONE

A New Lining for Fire Chambers in Trade SOFT COAL Mark. Soft Coal Stoves. A Late Discovery.

CHEAP. DURABLE. CLINKERLESS. TRY IT.

It has proved to be the MOST ECONOMICAL AND ENDURING LINING EVER USED IN SOFT COAL STOVES. It will add to the value of stoves without increased cost.

NEWTON & CO., Sole Manufacturers, Albany, N. Y.

See Testimonials, besides which we have numerous others of the same tenor.

RANSOM STOVE WORKS,
ALBANY, N. Y., Oct. 9, 1879.

Messrs. NEWTON & Co., Albany, N. Y.—*Gents:* We have been testing your new brick for several months in a stove (the "Denmark," late "Derby") burning soft coal, and have submitted the brick to the severest test, by the most intense heat when cast-iron would melt, and after repeated examinations we cannot discover the *least indication of adhesion of clinker.* If you can furnish a brick such as we are testing, it will fill a great want, viz.: durability and cheapness, as compared with iron linings.

Yours respectfully, S. H. RANSOM.

DETROIT, MICH., Jan. 2, 1880.

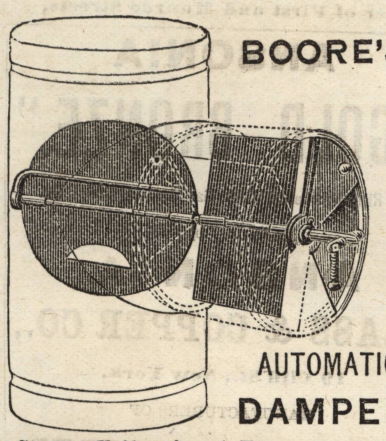
Messrs. NEWTON & Co., Albany, N. Y.—*Gents:* In reply to yours of 30th, would say that we have used your Fire Stone for some time, and consider them in all respects superior to any thing else we have ever seen or used. Yours truly,

MICHIGAN STOVE CO.
M. B. MILLS, *Purchasing Agent.*

[Extract from the BOSTON COM. BULLETIN, January 10, 1880.]

Newton & Co. of Albany, well known and prominent for many years in the manufacture of fire brick, have after long and persevering experiments succeeded in producing a *clinkerless soft-coal fire stone* lining, which has been put into extensive use the last few months, and is winning golden opinions from the soft-coal burning sections of the country. It is *unlike any* stove lining ever before made, and the secret of its manufacture is solely theirs. Hitherto the difficulties of producing a stove, either for the parlor or the kitchen, to satisfactorily burn soft-coal, has baffled the skill that has been so abundantly exercised by stove manufacturers. The triumph of Newton & Co., in producing this *fire stone* lining has enabled manufacturers, who were alert to seize upon it, to produce a better stove for burning soft coal for this season's trade than has ever before been placed on the market, and the West is taking them with avidity. From annually making a wide circuit in the West, the BULLETIN correspondent has become familiar with the annoyances experienced in the soft coal burning sections, and may be pardoned for expressing with some enthusiasm a high appreciation of what these parties have undoubtedly accomplished.

The public expect something new every year in the stove line, but it is doubtful if ever improvements have appeared that have so soon brought such a shower or *tidal wave* of commendations and congratulations as flow in from the West. And with the new stone lining not an iota of clinker adhered to a stove we saw that had been in use since cold weather came on, fed with the most stubborn of tarry soft coal.



BOORE'S AUTOMATIC DAMPER.

Secures Uniformity of Temperature regard less of change of weather, thus avoiding care and saving time in the management of stoves and furnaces. **Insures against all danger from fire,** so often caused by an overheated stove or furnace. For particulars, price, &c., address

PETER J. REICHERT, 537 Main St., Buffalo, N. Y.

Inquiries and orders from New England States must be addressed to AUTOMATIC DAMPER CO., 94 Arch Street, Boston, Mass

---

"BRIGHTWOOD COMPRESSION WORK."

The Best and Cheapest.

Wherever tried admitted to be the best in the market.

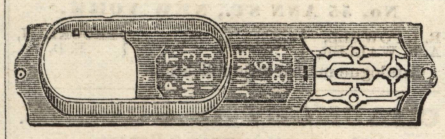
MANUFACTURED ONLY BY THE

E. STEBBINS MFG. CO.,

Brass Founders and Finishers,

Brightwood, (Springfield), Mass.

Send for Circular and Price List.



READ'S

Regulating Check Damper

Patented June 16, 1874; reissued July 15, 1879, and Double-quick Damper, patented Dec. 16, 1879.

Foundries that adopt these improvements will increase their sales and at the same time benefit their customers. The price to use the three patents is 10 cents per range. Licenses can be secured of *JOSIAH M. READ,* Inventor and Patentee, 63 Blackstone St., Boston, Mass.

HENDERSON'S DOME FURNACE.

The Dome is Cast Solid and has no Joints. It is the Best and Cheapest Furnace Made.

THIS FURNACE

IS MADE TO BE

Tight Without Cement

and is easily put up for use, and can be set in any kind of place, being made of

ALL CAST IRON,

and is not liable to get out of repair or leak gas.

THE FIRE POT AND GRATE ARE LARGE,

which insures its working every time with

Little Trouble or Care.

The surfaces being large, makes it a very

POWERFUL HEATER.

The best of references furnished in regard to their merits.

Send for Catalogue and Price List.

Four Sizes are Made,

and can be set either in brick or portable form.

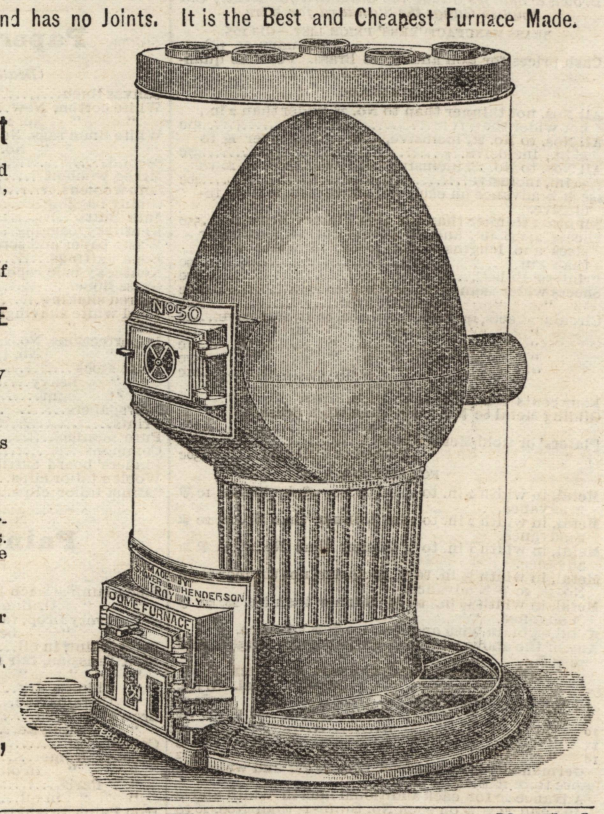
No. 40, No. 50, No. 60, No. 70.

MADE BY

J. C. HENDERSON,

193 RIVER ST.,

TROY, N. Y.



No Brush No Water Needed.

JACOBY'S "BRILLIANT" SELF SHINING STOVE POLISH.

Factory, NEWARK, N. J.

Ask your dealer for it and take no other. It is the best in market.

BEWARE OF WORTHLESS IMITATIONS.

Address all letters to

J. C. JACOBY,

57½ VESEY STREET, NEW YORK.

Was awarded the Diploma of Merit at the American Institute Fair, 1878, and Agricultural an Art Association Fair at Toronto, Canada, 1878.

Wholesale Prices in New York

METALS.

Bar Iron, from Store.

Common Iron:
¾ to 2 in. round and square.....
1 to 6 in. x ¾ to 1 in..... ₩ lb @ 3.2c
Refined Iron:
¾ to 2 in. round and square.....
1 to 6 in. x ¾ to 1 in..... ₩ lb @ 3.5c
1 to 6 in. x ¼ and 5-16..... ₩ lb @ 3.7c
Rods—⅜ and 11-16 round and square... ₩ lb @ 4.0c
Bands—1 to 6 x 3-16 to No 12..... ₩ lb @ 4.0c
Norway Nails Rods..... 6¼c

Sheet Iron.

	Common American.	R. G. American.
Nos. 10 to 20	₩ lb 5 @ 5¼c	6½@
21 to 24	" 5½ @ 5¾c	6¾ @
25 to 26	" 6 c	7 @
27	" 6¼c	7¼@
28	" 6½c	7½ @
Galvanized, 10 to 20, B B,	₩ lb 11½c; 2d quality,	₩ lb 10½c
" 21 to 24,	" 12½c "	" 11½c
" 25 to 26,	" 13½c "	" 12½c
" 27	" 14½c "	" 13½c
" 28	" 15½c "	" 14½c
Patent Planished	₩ lb A, 13	B, 12 c
Russia	₩ lb, 13c @ 14c	
Am. Cold Rolled	₩ lb 6½ @ 7½ c	

Iron Wire.

Brass and Copper.....List of December 1879. dis 10 %
Bright and Annealed.....Nos. 0 @ 18. dis 25@27½ %
" " .....Nos. 19 @ 26. dis 35@37½ %
" " .....Nos. 27 @ 36. dis 40@42½ %
Coppered.....Nos. 0 @ 18. dis 20@22½ %
Galvanized, Nos. 0 to 6..... ₩ 100c. dis 15@17½ %
" Nos. 7 to 18.....market list, dis 15@17½ %
Tinned, Nos. 0 to 18.....dis 25@27½ %
Tinned Broom Wire, Nos. 18 to 25..... dis 37½@40 %
Annealed Fence, Nos. 8 and 9..... dis 25@27½ %
" Grape. Nos. 10 to 14..... dis 25@27½ %
Galvanized Telegraph, Nos. 7 to 9..... ₩ lb 9c
" " Nos. 10 and 11..... ₩ lb 10c
" " No. 12..... ₩ lb 10½c
Fence Staples..... ₩ lb 7¼@7½c
" Staples, Galvanized..... ₩ lb 8¼@8½c
Japanned Barb Fence..... ₩ lb 14c
Galvanized " ..... ₩ lb 15c
Judd's Picture Wire.....dis 80&20&10 %
Clothes Line Wire, Galvanized..... ₩ coil 50c net

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Copper, 4c ₩ lb: Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

SHEATHING, BRAZIERS' COPPER, BOLTS, &C.

Braziers' Copper, ordinary sizes, 10 oz., ₩ sq. ft. and over..... ₩ lb 34c
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., ₩ sq. ft..... " 36c
Braziers' Copper 10 oz. and 12 oz., ₩ sq. ft..... " 38c
Lighter than 10 oz., ₩ sq. ft..... " 40c
Circles less than 8¼ inch in diameter..... " 37c
" 8¼ inch diameter and over..... " 40c
Segment and Pattern Sheets..... " 37c
Locomotive Fire-Box Sheets..... " 34c
Sheathing Copper, over 12 oz. ₩ sq. ft..... " 32c
Bolt Copper..... " 34c
Copper Bottoms..... " 34c

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48, by the case..... ₩ sheet 6c
14x48, less than case..... " 8c
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER. net.

14x48.
16 and 16 oz. and heavier...37c By the case...₩ lb 36c
12 oz. and lighter.....40c " " " 39c

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
and 16 oz. and heavier....39c By the case...₩ lb 38c
(And all sizes not over 20 inches wide.)
30x60.
14 and 16 oz. and heavier..... ₩ lb 41c
12 oz..... " 44c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis 10% January 15, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lb, add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in.....32c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....37c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive.....40c
½c ₩ lb advance on each No. above Nos. 28 to 38, inclusive.
All brass thinner than No. 38 is Platers' Brass, at...55c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in.....39c
Printers' Rules.....47c
Sheets wider than 30 in. and under 40 in.....49c
" 40 in. and over.....52c
Circular sheets, in diam. from 4 in. to 14, inclusive...42c
" " over 14 " 20, " ...47c
" " " 20 " 30, " ...51c
" " " 30 " 40, " ...57c
" " " 40 in..... ..61c

LOW BRASS.

Four cents ₩ lb more than High Brass.
Gilding Metal 8c ₩ lb more than High Brass.
Platers' or Gold Metal { In Bars.....50c; Sawed.....53c; Planed or Polished.....56c

FOR SLITTING.

Metal, in width 2 in. to ⅛ in. to No. 28, inclusive 1c ₩ lb advance.
Metal, in width 2 in. to 1 in. thinner than No. 28, 2c ₩ lb advance.
Metal, in width 1 in. to ⅛ thinner than No. 28, 3c ₩ lb advance.
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c ₩ lb advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.
Metal, ¼ in. in with and less, 10c ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 in. to No. 26	$0.52	$0.70
6 " " "	.56	.76
10 " " "	.64	.88
15 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12 in. wide and weighing more than 16 lb. $2 ₩ lb.
Advance 2c for each additional inch in width above in., and 2c ₩ lb on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50c ₩ lb additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 0 to 20	$0.35	$0.39	$0.45
No. 21	.38	.42	.48
No. 22	.39	.43	.49
No. 23	.41	.44	.50
No. 24	.42	.46	.52
No. 25	.45	.49	.55
No. 26	.47	.51	.57
No. 27	.50	.54	.60
No. 28	.54	.58	.65
No. 29	.57	.61	.68
No. 30	.60	.64	.74
No. 31	.54	.68	.80
No. 32	.68	.72	.86
No. 33	.72	.76	.95
No. 34	.76	.80	1.05

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire, 4c ₩ lb advance on Round Wire.
Fancy Wire not less than 6c ₩ lb advance Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths, 38c.
Wire straightened and cut smaller than No. 8, and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents ₩ lb extra for spooling on 1 lb spools.

MISCELLANEOUS.

Brass Pail Ears..... $0.52
Brass Door Rail..... .45

SCRAP—Net.

High Brass..... $0.14
Low " ..... .16
Gilding ..... .18
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING—DIS. 10 %

	₩ lb
Plain to No 20, inclusive, above ¼ in. to 3 in	$0 45
" above 3 in	.55

Nos. 21, 22, 23, 2c advance on List for each Number.
Nos. 24, 25, 26, 4c advance on List for each Number.
Above No. 26 special rates.

Plain ¼ in	.72
" 3-16 in	1.12
⅛ in	1.62

All Mandrel Drawn Tubes, 5 cents advance on List Prices.

Fancy Tubing to No. 20	.52
English, Scotch and Extra Patterns Fancy Tubing to No. 20	.57

Tubing Sawed or Cut 2 to 4 feet long, 2c advance on List.
Add to 2c ½c for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ⅜ in., 25c ₩ lb advance.

ZINC TUBING—NET.

Plain	.29
Fancy	.35
Scotch and Extra Patterns	.38

GERMAN SILVER TUBING—DIS. 10 %.

4 per cent	.80	15 per cent	1.35
6 "	.90	16 "	1.40
9 "	1.05	18 "	1.50
12 "	1.20	20 "	1.60

LEAD—DUTY: Pig, $2 ₩ 100 lbs.; old Lead, 1½c ₩ lb: Pipe and Sheet, 2½c ₩ lb.

American..... 6½c
Bar..... dis 10 %..... 7½c
Pipe..... dis 10 %..... 7¾c
Tin-Lined Pipe..... dis 10 %..... 15c
Sheet..... dis 10 %..... 8¼c
Shot.....dis 10 % Drop 9½c Buck, 10½c dis 10 %
Chilled Shot.....10½c dis 10 %

BABBITT METAL.

N. P. U.....₩ lb 7 @ 8c
A. 20c B, 16c; C, 12c; D.

ANTIMONY .....20 @ 22c

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 % ad val. Bars, Block and Pigs free. Banca, subject to duty of 10 %.

Banca..... ₩ lb 28c
Straits..... ₩ lb 26c
English..... ₩ lb 25c

TIN PLATES.

I C 10x14 } 14x20 }	Prime Charcoal	$10.00@ 10.50
12x12	"	$10.25@ 10.75
I X 10x14 } 14x20 }	Prime Charcoal	$12.00@ 12.50
12x12	"	$12.25@ 12.75
D C 12½x17	"	$9.50 @ 10.00
D X 12½x17	"	$11.50@ 2.00
For each Aditional X add		2.00

COKE TIN PLATE.

	Best.	2d. quality.	Wasters.
I C 10x14 } I C 14x20 }	$9.50	8.75 @ 9.00	8.25 @ 8.50
I C 12x12	$9.75	9.00	8.50 @ 8.75

TERNE PLATE.

	Prime Char.	2d. quality.	Coke.
I C 14x26	9.25 @ 9.50	@ 9.00	@ 8.75
I X 14x20	@ 11.50		
I C 20x28	19.00 @ 19.50	18.00 @ 18.50	@ 17.50
I X 20x28	@ 23.50		
I C 20x200	@ 27.00		
14x28 M. F. Brand			11.00

SOLDER.....No. 1, 14c @ 15c; No. 2, 13½c
SPELTER—DUTY: Pigs, Bars and Plates, $1.50 ₩ 100 lbs.
American, ₩ 100 lbs..... 6½c@6¾c
Bergen Port from Lehigh Ore..... 10c
Lehigh, on spot..... 9c
ZINC—DUTY: Pig or Block, $1.50 ₩ 100 lbs. Sheet, 2½c ₩ lb.
Sheet, " ..... cask, 8¼ @ 8½c
" ..... open, @ 9 c

Paper Stock, &c.

(Dealers' Selling Price.)

Canvas linen..... @ 5
White cotton, New..... 5½ @
" " No. 2..... 3½ @
White linen rags, No. 1..... @ 6 c
" " No. 2..... 4 @ 4½c
Seconds..... 2½ @
Mixed woolens..... 2½ @ 3¼c
Soft woolens..... 4 @ 4½c
Gunny bagging..... @ 18 c
Jute Butts..... 3½ @ 3½c
Kentucky bagging..... 4½ @
Waste paper and scraps..... @ 1c
Rope cuttings..... 1½ @ 3 c
Kentucky bale rope..... 4 @ 4½c
Grass Rope..... 3½ @ 3¾c
Tarred shaking..... 1½ @
Hard white shavings, No. 1..... 3½ @ 4c
Soft " No. 1..... 3 @ 3½c
Imperfections, No. 2, best folded sheets..... 3¼ @
" No. 1, heavy stock..... 3½ @
Book stock..... 2¾@3c
" heavy..... 3c
" light..... 1½@1¾c
Newspapers..... 2¼ @ 2½c
Prints..... 1½ @
Pure manilas..... 2 @2½c
Commons..... 70 @
Binders' board cuttings..... 80 @
Woolen tailor clips..... 18 @ 19c
Satinet tailor clips..... 2½ @ 3½c

Paints, Oils, etc.

Paints.

Black lamp—Coach Painters..... ₩ lb 20c
" " Ordinary..... 6c
" Ivory Drop, fair..... 12 @ 15c
" " best..... 23c
Black Paint, in oil..... kegs, 8c; assorted cans, 11c
Blue, Prussian, fair to best..... 40 @ 55c
" " " in oil..... 25 @ 55c
" Chinese dry..... 83c
" Ultramarine..... 18 @ 30c
Brown, Spanish..... 1¼c
" Van Dyke..... 10 @ 12c
Carmine, 40..... combination price
Green, Chrome..... 15 @ 23c
" " in oil..... 14 @ 18@ 25c
" Paris..... good, 25c; best, 30c
" " in oil..... " 30c; " 45c
Iron Paint, Bright red..... ₩ lb, 2¼c
" Red..... " 2c
" Brown..... " 1½c
" Purple..... " 3c
" Ground in oil, Bright Red..... " 5½c
" " " Red..... " 5c
" " " Brown..... " 4½c
" " " Purple..... " 6c
Mineral Paints..... 1¼ @ 4c
Orange Mineral..... 10c
Red Lead, American..... 7½c
" Venetian (N. C.) dry..... $1.65 @ $1.70
" " in oil..... asst'd cans, 11c; kegs, 8c
" Indian dry..... 9 @ 12c
Rose Pink..... 10 @ 13c
Sienna, American, Raw..... 4c
" Burnt..... 4½c
" " in oil..... 10 @ 16 @ 20c
" Raw " ..... 11 @ 15 @ 25c
Umber, Burnt..... 4 @ 8c
" " in oil..... 9 @ 12 @ 16c
" Raw..... 3½ @ 7½c
" " in oil..... 10 @ 16 @ 18c
Vermillion Chinese..... 90c
" English..... 60 @ 62½c
" Trieste..... 1.10c
" American, Common..... 15c
White Lead, American, pure dry..... 6 to 7c
" " " in oil..... 8½c to 9c
White, Paris, English, prime.....in bbls. 2 @ 2½c
Yellow Ochre, French..... $1.75
" " " in oil...asst'd cans, 11c; kegs, 8c
" " Vermont.....in casks 1½c
Yellow Chrome.....17 @ 27c
" " in oil.....14 @ 18 @ 25c
Zinc White, American No. 1, dry..... 5 @ 5½c
" " No. 1, in oil..... 9c
" French (Paris)..... 6 @ 10c
" " in oil..... @ 10c

Oils.

Linseed, Raw, in casks and bbls..... ₩ gal. 85@ 86c
" Boiled, " " ..... 90@91c
Bleached Whale..... 64c
" Elephant..... 68c
" Sperm..... 1.25c
Signal..... 65c
Prime Lard..... 66c
No. 1 " 60c
West Virginia..... 18 @ 28c
Drilling..... 40c
Empire Cylinder..... 62c
Miners Oil..... 45 @ 50c
Fish Oil, pressed..... 48c
Neatsfoot..... 85c
Tallow..... 7c

Machinery..... 40c
Engine..... 50c

Sundries.

Asphaltum..... 9c
Benzine..... ₩ gal. 16c
Chalk..... ¾c
" Block..... ¾c
Dryer, Patent, Am'n.....ass't cans 10½c; keg, 9c
Frostings..... 50c
Glue, White..... 33 @ 44c
" Sheet..... 20c
Glaziers' Points, Zinc..... 8c
Gum, Copal..... 36c
" Damar..... 25c
" Shellac, English..... 48c
" " dark..... 42c
Litharge, English..... 7½c
Mineral Wool, lb..... 1¼ @ 1½c
Pumice Stone, selected Lumps..... 4 @ 5c
" " powdered..... 2¾c
Putty in bladders..... 3c
" in bulk..... 2½c
Rotten Stone, soft, English..... 4c
Spirits Turpentine..... 42c
Whiting, Spanish..... 34c

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CHARCOAL LEADED PLATE, IC 20x28, IX 20x28.

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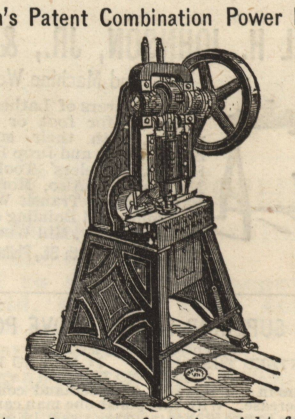

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